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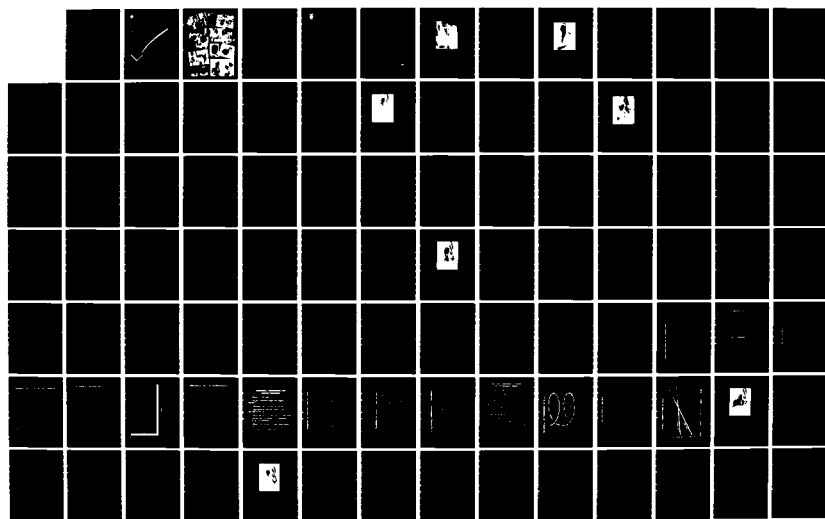
BOTTOM LINE CONFERENCE HELD ON MAY 13 1982 AT FORT  
LESLEY J MCNAIR WASHINGTON DC(U) OFFICE OF THE  
SECRETARY OF DEFENSE WASHINGTON DC 1982

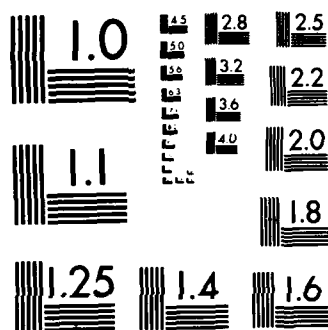
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MICROCOPY RESOLUTION TEST CHART  
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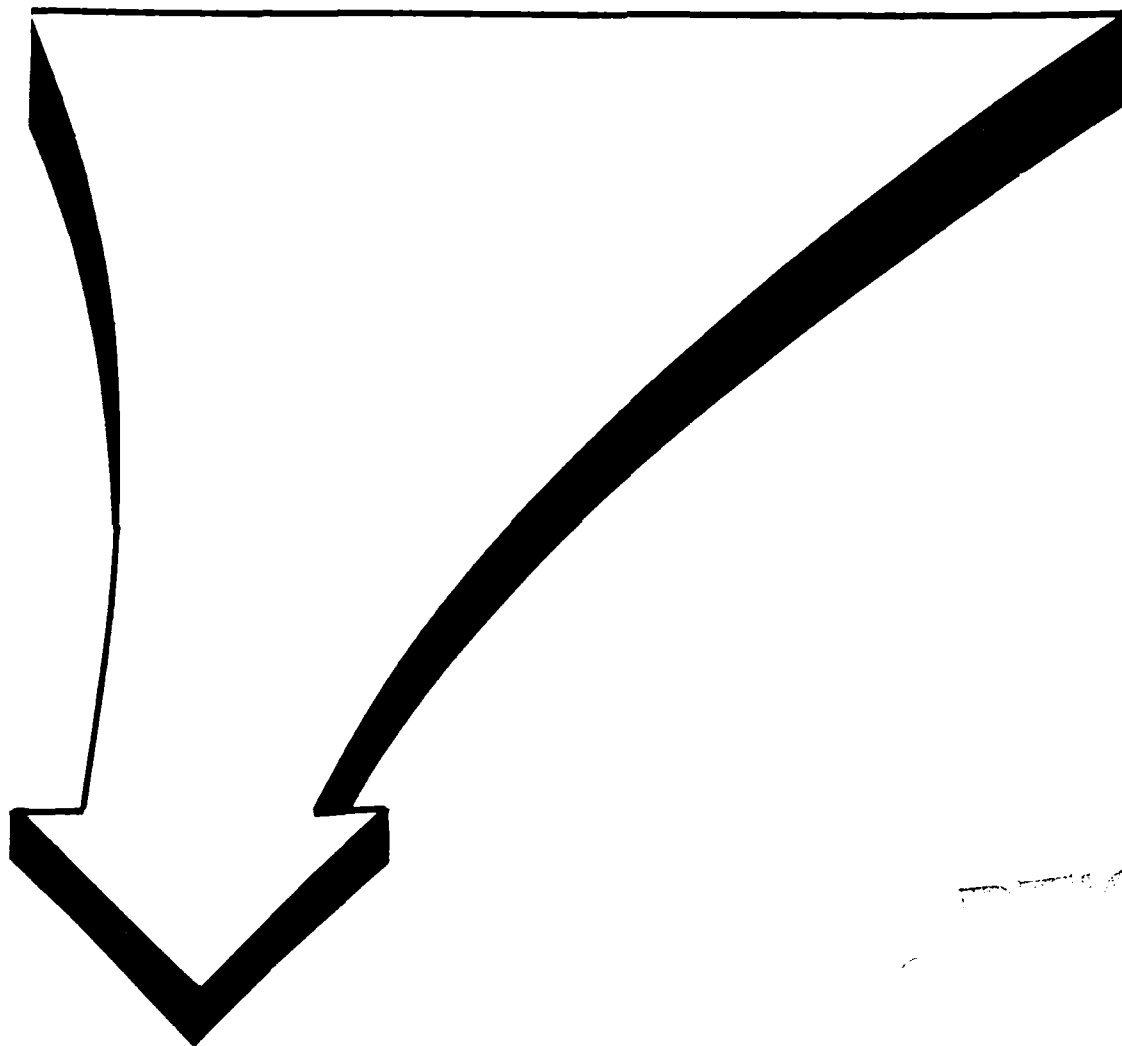
FORT LESLEY J. McNAIR, WASHINGTON, DC

MAY 13, 1982

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# *Bottom Line Conference*

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"QUALITY" The Bottom Line

*Top Management's Responsibility*

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BOTTOM LINE CONFERENCE

14 June 1982

13 MAY 1982


FORT McNAIR, WASHINGTON, D.C.

INTRODUCTION

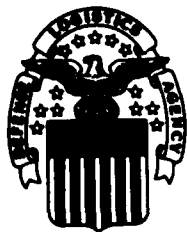
The conference was held under the sponsorship of the Office of the Secretary of Defense, and was hosted by the Defense Logistics Agency. The primary theme was that the bottom line is product quality, a top management responsibility.

During the conference, top level Government officials met with industry Chief Executive Officers to express their growing concern regarding the overall quality and reliability of defense equipment. Highlighted was the fact that poor quality adversely impacts four major areas: the costs of weapons systems; the readiness of our armed forces; our economic well being; and our image as the world's industrial leader.

I am most grateful for the excellent presentations made by all the speakers; and I sincerely appreciate the interest displayed by the Chief Executive Officers, or their representatives, who participated in the conference.

  
E. A. GRINSTEAD  
Vice Admiral, SC, USN  
Director

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## BOTTOM LINE CONFERENCE

DEWITT AUDITORIUM, NATIONAL WAR COLLEGE  
May 13, 1982  
Fort McNair, Washington, D.C.

### AGENDA

- 0815 Registration
- 0850 Moderator: Rear Admiral Frank C. Collins, Jr., USN, Executive  
Director of Quality, Defense Logistics Agency
- 0855 Presentation of Colors
- 0900 Welcoming Remarks: Mrs. Elizabeth H. Dole, Assistant to the  
President for Public Liaison
- 0920 Senator John W. Warner of Virginia, Keynote Speaker
- 0950 Coffee - Tea Break
- 1015 General Robert T. Marsh, Commander, Air Force Systems Command \*
- 1105 Dr. J. M. Juran, President, Juran Enterprises \*
- 1145 Lunch - Proceed to Fort McNair Officers Club for Buffet Luncheon
- 1300 Reassemble
- 1305 Honorable Frank C. Carlucci, Deputy Secretary of Defense \*
- 1345 Admiral John G. Williams, Chief of Naval Material \*
- 1420 Mr. Thomas J. Murrin, President, Westinghouse Public Systems \*
- 1455 Vice Admiral Eugene A. Grinstead, Director, Defense Logistics  
Agency \*
- 1530 Coffee - Tea Break
- 1545 Lieutenant General Robert J. Lunn, Deputy Commanding General,  
Department of the Army Materiel Development and Readiness  
Command \*
- 1615 General Paul X. Kelley, Deputy Commandant, United States Marine  
Corps \*
- 1650 Closing Remarks and Adjournment, RADM Frank C. Collins, Jr., USN

\* Includes Question and Answer opportunity.

## BOTTOM LINE CONFERENCE

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BOTTOM LINE CONFERENCE



MODERATOR

"Quality doesn't cost.....it's priceless."

REAR ADMIRAL FRANK C. COLLINS, JR., USN  
EXECUTIVE DIRECTOR OF QUALITY  
DEFENSE LOGISTICS AGENCY



From Rear Admiral Collins opening remarks:

"ECONOMIES ARE LIKE BICYCLES. THE FASTER THEY MOVE, THE BETTER THEY MAINTAIN THEIR BALANCE UNAIDED. AN ECONOMY EXPERIENCING RAPID GROWTH CAN ADJUST WITH RELATIVE EASE TO CHANGES IN SUPPLY, DEMAND AND TECHNOLOGY," WRITES ROBERT REICH IN THE SPRING EDITION OF FOREIGN AFFAIRS. "ADJUSTMENT IS LESS AUTOMATIC, HOWEVER, IN AN ECONOMY GROWING SLOWLY." HE CONTINUES, "BECAUSE THE PROCESS OF ECONOMIC CHANGE MAY SERIOUSLY THREATEN THEIR FUTURE WELL-BEING, THEY TURN TO POLITICAL DEVICES DESIGNED TO STEM THE TIDE, AT LEAST TEMPORARILY: LEGISLATION TO STOP RUNAWAY PLANTS, REGULATIONS TO PROHIBIT THE INTRODUCTION OF NEW TECHNOLOGIES, GOVERNMENT FINANCED BAILOUTS. BUT PROTECTIONS LIKE THESE RETARD FUTURE ECONOMIC GROWTH BY ENCUMBERING THE MOVEMENT OF RESOURCES TOWARD MORE PRODUCTIVE USES, AND THE DOWNWARD CYCLE PERPETUATES ITSELF," END OF QUOTE. OUR NATION IS CURRENTLY EXPERIENCING ECONOMIC PROBLEMS OF FAR REACHING IMPACT.

THE PURPOSE OF THIS CONFERENCE IS TO EXPLORE THE DUAL IMPACT OF POOR QUALITY. THIS INCLUDES THE IMPACT ON OUR NATIONAL ECONOMY AND YOUR BOTTOM LINE WHICH IS PROFIT, COMPETITIVENESS AND SURVIVABILITY AND THE IMPACT ON READINESS AND DEFENSE BUDGETS TRIGGERED BY POOR QUALITY WEAPONS SYSTEMS AND MATERIAL. WE HAVE A SLATE OF SPEAKERS TODAY - ALL TOPS IN THEIR FIELD - WHO WILL SHARE THEIR THOUGHTS ON THIS MOST IMPORTANT BOTTOM LINE SUBJECT.

BOTTOM LINE CONFERENCE



"One of our highest priorities is to improve the combat readiness of our military."

MRS. ELIZABETH H. DOLE  
ASSISTANT TO THE PRESIDENT FOR PUBLIC LIAISON

ELIZABETH HANFORD DOLE  
ASSISTANT TO THE PRESIDENT  
FOR PUBLIC LIAISON

Defense Logistics Agency's "Bottom Line"  
Conference at the National War College

MAY 13, 1982

Good morning, ladies and gentlemen. It is a particular honor to be here today, representing the President, before such a distinguished group of leaders from the defense community. When the President first asked me if I would stand in for him today, I was a bit surprised. While one of my responsibilities in the White House is liaison with the business community at large, I am not an expert on the defense industry. But then I reflected for a bit and realized that while I may not be an expert on MX basing or on the M-1 tank, I am a combat veteran; of sorts. As a White House Staff member, who reads the daily newspapers in our nation's capital, I know something about pot shots, light weapons and heavy artillery. I've also had some experience with unguided missiles, smart bombs and dumb bombs.

But seriously, one does not need to be a defense expert to realize that it is absolutely essential for the United States once again to focus its attention on defense, and to make the kind of efforts necessary to repair our military strength.

During the campaign and in the 16 months since he has taken office, President Reagan has reiterated his commitment to rearm America. The Soviet military buildup, plus a decade of declining American defense budgets, has led to a serious state in the U.S.- Soviet military balance. The Soviet Union, emboldened by new military might and America's post-Vietnam paralysis has, in recent years, assumed a much more expansionist and aggressive foreign policy. We must take the steps today which will revitalize our deterrent.

By the late 1970s our conventional forces in Western Europe and Northeast Asia had become increasingly out of balance with those of the Soviets. The strategic nuclear balance was beginning to tip to the Soviet's advantage, eroding the deterrent value of our strategic nuclear forces. The Soviet deployment of a new generation of intermediate range missiles aimed at Europe eroded the deterrent value of our theater nuclear forces. In the midst of all this, President Carter announced his decision to prevent any outside force from gaining control of the Persian Gulf Region, but he neither sought nor was given the resources to implement that decision fully. Finally, the introduction of Soviet military presence and proxy forces into many regions of the world threatened to outflank the defenses of our allies.

It comes as no surprise to those of you in the defense industry that our armed forces were in serious need of repair when President Reagan took office. As a result this Administration has proposed a three point program: to improve the combat readiness of our existing forces, to improve the combat sustainability of our forces, and to begin a modernization program aimed at replacing the aging equipment now deployed by our forces.

One of our highest priorities is to improve the combat readiness of our military. We sought more spare parts, training, and operations and maintenance in the FY 1981 and FY 1982 budgets, and we will continue to do so. In addition, we found manpower shortages in several categories. Skilled military personnel were leaving the military for higher paying jobs in the civilian economy. To retain this pool of skilled manpower we asked for and were granted increases in military pay and reenlistment bonuses and benefits. Now the All-Volunteer Force is working well. We quite literally cannot accept all who apply; and their educational level is much higher than those who applied two years ago. Also, more of our enlisted personnel and officers are choosing to stay in the Service, and that is a most welcome change.

We next must be able to increase the sustainability of our forces in order to balance the Soviets' ability to endure

a prolonged conventional conflict. Our budgets request monies for replacement equipment, spare parts, ammunition, fuel; and other consummables as well as upgraded equipment for the Guard and Reserves. Those improvements, and our efforts to rehabilitate the industrial base, send a clear signal to the Soviets that they cannot start a conflict in the hopes of outlasting the United States.

While our funding for readiness and sustainability contributes to the improvement of our forces today, we must also invest in the future. We need to modernize our military equipment so it can deter and if necessary defend against the new generations of Soviet intermediate range nuclear and conventional weapons.

To enhance our theater deterrent, we will deploy ground launched cruise missiles and PERSHING II missiles in Europe. Of course if the Soviets accept President Reagan's proposal, now under negotiation at Geneva, such deployment would not be necessary.

To counterbalance the increasing sophistication of Soviet conventional forces, we have a program to modernize

the equipment of our ground and air combat forces. These new weapons, particularly the M-1 tank, the Bradley infantry fighting vehicle and the new generation of fighter aircraft, offer the optimum combination of firepower and maneuverability required on the modern battlefield. We cannot do less in the face of the quantitative advantages and the continuing qualitative improvements in Soviet weapons.

The Navy will also benefit from modernization efforts. To repair the erosion of our conventional maritime strength we have designed a program which will increase the offensive striking power of the fleet, improve day-to-day fleet readiness and sustainability, strengthen our anti-submarine and anti-air defense, and modernize our existing naval forces. In short we seek Naval strength sufficient to enable us to get where we need to be, when we have to be there.

By making major increases in the number of fleet ships and aircraft, we will provide protection for our maritime trade and supply convoys to Europe and Asia, as well as improve the mobility needed for our rapid deployment forces.

To provide the measure of mobility required for conventional flexibility, we have requested additional air and sealift

capabilities. The largest single increase in this year's defense budget is for airlift. We also plan to increase our fleet of refueling aircraft to sustain our airlift over longer distances.

Finally, President Reagan has proposed a modernization program for our strategic nuclear forces. Virtually every part of our strategic forces is in need of both modernization and strengthening. The Minuteman system for missile basing was decided on more than 20 years ago. The mainstay of our present bomber force, the B-52, was chosen some 30 years ago, forcing our pilots to fly planes older than themselves. The only comparable across-the-board review of strategic force needs occurred in 1955, when Dwight Eisenhower was in the White House, and the United States decided to proceed with the ICBM and new system for bomber basing and air defense.

To review briefly President Reagan's strategic program, which most of you are quite familiar with, there are five parts.

-- First -- we plan long neglected improvements in our command and control systems. This will enable us to better-operate all parts of the Triad: land, sea and air.



- Second -- we will modernize our strategic bomber fleet to replace our 30-year-old B-52s, so we can continue to have an ability to penetrate Soviet air defenses by manned bombers.
  
- Third -- we will deploy new, heavier, and far more accurate submarine-launched ballistic missiles -- in many ways, the most survivable of all defense systems.
  
- Fourth -- we will undertake a step-by-step plan to improve the strength and accuracy of the new MX land-based missiles (which are far more accurate and which carry 10 warheads apiece). We will also seek out ways to reduce the vulnerability of the MX.
  
- Fifth -- we will improve our strategic defenses as yet another means of discouraging and deterring attack.

The restoration and upgrading of our military forces is an expensive and lengthy process. It is particularly difficult in this economy and given the sacrifices required in other programs. But it is essential that we follow this long, hard road with resolution, determination and consistency.

\* \* \*

Now that I have outlined what the Reagan Administration is doing to repair defenses and restore the military balance, I turn to you as the other part of the equation. All these fine sounding plans and programs will amount to very little without your help and cooperation.

As you know, in the past we have offset the Soviet Union's numerical advantage with American technological superiority. But over the past decade we have let our edge in technology slip, partly because we were not investing the funds necessary and partly because the Soviets were investing their ever increasing defense budgets in more sophisticated weapons and equipment.

During the past decade, the Soviet Union made major advances in the development and production of defense material. As a consequence, they enter the mid-1980s with a dramatically improved military capability. Their objective has been <sup>to</sup> overtake the United States in defense technology while maintaining their numerical advantage. They have had a remarkable degree of success in achieving that objective by making an enormous investment, and maintaining an unwavering emphasis on defense. Today more and more categories of Soviet weapons are just as sophisticated and capable as comparable U.S. weapon systems.

The United States is now in danger of losing its traditional technological advantage. Still, we also have some distinct advantages: a superior technological base, a competitive industry with greater productivity; and, allies with a substantial industrial capability. In order to meet the formidable challenge we face, our strategy must be to provide American industry with the necessary capital and incentive to get the job done. But American industry must meet that challenge. We need those of you sitting here today to return to your companies, to your assembly lines and to your engineers and urge them to pull out all the stops. All of our efforts depend on your ability to provide reliable and top quality products. We in the Administration, and in the country, look to you, in fact we challenge you, to give it your all. We look to you to meet your defense contracts on-time and on-cost.

We look to you for honest, up front cost estimates, not artificially low prices to "buy in" to a contract. We look to you to reduce and eliminate expensive cost overruns and delays. And finally, we look to you to provide first rate equipment the first time around - we cannot afford the high cost of scrap and rework to consume our defense budget.

Throughout the day, you will be given a series of briefings by several of the top people from the Pentagon, Capitol Hill and industry. They will go into detail regarding what we need from you and how you can help.

Let me close by stressing how very important it is to the President that you make this all out commitment.

Thank you very much.

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BOTTOM LINE CONFERENCE

"We enjoy a favorable trade balance which could erode unless our products are of better quality and available at a more competitive price."

SENATOR JOHN W. WARNER  
OF VIRGINIA

"VIEW FROM CAPITOL HILL"

REMARKS OF SENATOR JOHN W. WARNER

I appreciate those kind words of introduction. Well, I am proud of the fact I did go to boot camp twice -- once as a sailor, and once as a Marine. I think it was that service in the lower ranks of two of our nation's great services which gave me the background to develop my present perspective on America's military posture and your very important role in that posture.

As a matter of fact, had it not been for my service during World War II and the Korean conflict, I would not be here today. The G.I. Bill benefits I earned paid for my education and provided the opportunities of my life.

But in looking at the impressive list of speakers you will hear during this program, I am at a bit of a loss to determine why in the world you want to hear from a tired old politician. As a politician, I am very concerned about public opinion, particularly public support for government policy.

In 1980, President Reagan was elected, many of us thought, with a clear mandate to rebuild America's military strength, and to regain America's position as a dependable leader in the free world.

To succeed with that mandate, the President put forth a plan which called for significant increases in the defense budget. At the same time, the President sought major tax cuts, and significant reductions in the rate by which non-defense programs were growing.

History has thoroughly documented the events which have occurred since that first plan was offered. It would be an understatement to say that mandate for a stronger military posture does not enjoy the same support it once did.

Earlier this year, the Senate Armed Services Committee reduced the President's defense budget request by \$3.2 billion in outlays for FY '83 and, at this hour, the Senate is debating an authorization measure which cuts \$5 billion more for the next fiscal year, and upwards of \$30 billion over the next three years.

What this tells me as a politician is that the military budget has, in the language of the street, "a bad rep," -- a bad reputation.

The American public believes the price tag for defense is too high, that there is too much waste, fraud and abuse in the defense budget, and that, if social programs must be "cut," so too must the defense budget.

America's military strength can be no greater than the economic foundation upon which it is based. And, my friends, as you know, that foundation is not -- at the present time -- in such good shape.

Just as my colleagues in the Senate and the House of Representatives are seeking more effective weapons systems for our military, we also are seeking more effective use of our defense budget dollar. This is the only way we can restore public confidence.

Unfortunately, the public believes we are not getting all we need from U.S. defense contractors.

As recently as this week, one of my colleagues, speaking on the subject of nuclear freeze, made the following statement which I restate here to demonstrate the depth and the strength of the public perception.

"... this desire, on both sides, to seek with abandon to improve upon our ability to commit global suicide is not the function of scientists alone. Its momentum is given further impetus by a self-perpetuating bureaucracy of officials and defense contractors who seek to alarm us when their funds are threatened and now to placate us when their logic is torn asunder."

During the course of today's program, you will hear other speakers, who work with the various weapons systems and who are responsible for defense procurement, detail the horrors and disappointments of their dealings with many defense contractors. I won't dwell on their messages. They can provide the specifics of their experience better than I.

But I do want to impress upon you the difficulty we face in Congress trying to hold the line against the cynics and critics of the defense budget, and the growing move toward foreign manufacturers and contractors for a larger share of America's defense procurement needs.

"Buy America" is becoming a legislative initiative. We cannot hide behind that label. We are offered increasing numbers of excellent foreign weapons. American industry must meet this challenge with better quality weapons at competitive prices.

Those of us, myself included, who are trying to stop a possible trend towards greater foreign procurement, need your help. We must maintain the delicate balance between American and foreign procurement. We enjoy a favorable trade balance which could erode unless our products are of better quality and available at a more competitive price.

Roughly \$13.5 billion, 15 percent of our Defense budget, is being used to correct defects or to retool poorly manufactured defense inventories. That's more than the combined budgets of the Departments of Interior, Justice and State, plus the Environmental Protection Agency. On this basis, it is increasingly difficult for us to stand before our colleagues and argue that either our level of readiness, or the deterrents and safeguards of our forces are being served.

(MORE)

Ladies and gentlemen, I don't want to see the Pentagon forced to buy from foreign manufacturers products we once bought from American manufacturers.

The American defense budget dollar is a very scarce resource. We in Congress must shepherd it and see that it is used as wisely as possible. In the end, we must make a determination: Is it better used to buy available American products, or foreign products? Should it be spent for domestic programs rather than defense programs?

It would be a shame to be forced to buy the foreign product because the American product continued to be more costly yet inferior in quality. Even more tragic would be the decision to not buy any product.

We would suffer as a nation militarily and economically. That economic loss would surely guarantee the continued weakness of the foundation upon which our defense is built, and a further decline in our military capability.

To put it another way, the future of America's strength and the future of the free world demand the best America's can-do spirit can provide. You did it before and, on balance, I believe you are attempting to do it again.

Your effort must show greater progress -- and quickly.

We must meet the challenge of foreign competition -- both in cost and quality.

We cannot afford to fail.



BOTTOM LINE CONFERENCE

"I don't care how many people you have or how much inspection equipment you buy, if the quality isn't designed and built in, it won't magically appear by having someone inspect it."

GENERAL ROBERT T. MARSH, USAF  
COMMANDER, AIR FORCE SYSTEMS COMMAND

GENERAL ROBERT T. MARSH  
COMMANDER, AIR FORCE SYSTEMS COMMAND  
BOTTOM LINE CONFERENCE, DEFENSE LOGISTICS AGENCY  
FORT MCNAIR, WASHINGTON, D.C.  
13 MAY 1982

GOOD MORNING LADIES AND GENTLEMEN. I AM DELIGHTED TO HAVE THIS OPPURTUNITY TO SPEAK TO YOU TODAY ABOUT A TREMENDOUSLY IMPORTANT SUBJECT--QUALITY. IF ALL THE SPEECHES TODAY SOUND VERY SIMILAR, IT MAY REPRESENT THE SINGLEMINDEDNESS OF PURPOSE THAT WE IN THE GOVERNMENT AGENCIES HAVE ON THIS ISSUE.

AS I THOUGHT ABOUT THIS CONFERENCE, AN OLD STORY ABOUT A FLEA TRAINER CAME TO MIND. IT WAS HIS BUSINESS TO TRAIN FLEAS TO JUMP HURDLES. HE WAS GOOD AT IT AND ALWAYS SEARCHED FOR MORE IMPRESSIVE STUNTS. ONE DAY OUT OF BOREDOM, HE WAS EXPERIMENTING TO SEE HOW WELL A FLEA COULD JUMP WITH LESS THAN A FULL COMPLEMENT OF LEGS.

HE PULLED A LEG OFF A CHAMPION FLEA AND ORDERED IT TO JUMP OVER A HURDLE. IT DID WITH LITTLE DIFFICULTY. HE SNIPPED OFF ANOTHER LEG, AND YET ANOTHER. THE FLEA CONTINUED TO PERFORM AS EXPECTED. EVENTUALLY HE HAD WORKED HIS WAY DOWN TO JUST ONE LEG WHEREUPON HE DISCOVERED IT TOOK A TREMENDOUS EFFORT FOR THE FLEA TO CLEAR THE HURDLE.

THEN HE WHACKED OFF THE LAST LEG AND ORDERED THE FLEA TO JUMP. TO HIS CHAGRIN THE FLEA JUST SAT THERE, MOTIONLESS. IN FACT, NO MATTER HOW LOUD HE YELLED, THE FLEA REFUSED TO EVEN MOVE, MUCH LESS JUMP.

AFTER GIVING IT CONSIDERABLE THOUGHT, THE TRAINER ARRIVED AT THE STARTLING SCIENTIFIC CONCLUSION THAT IF YOU PULL ALL THE LEGS OFF A FLEA IT GOES DEAF.

PERHAPS WE HAVE DELUDED OURSELVES WITH A SIMILAR MISCONCEPTION ABOUT QUALITY. WE HAVE LABELED IT A COST DRIVER, A NECESSARY EVIL, JUST ANOTHER GOVERNMENT REQUIREMENT. THE CORRECT VIEW IS THAT QUALITY IS AN INVESTMENT WITH HIGH POTENTIAL FOR RETURNS. ITS CHANCES OF SUCCESS, HOWEVER, ARE GOVERNED BY THE ATTITUDES OF MANAGEMENT, JUST AS IT IS WITH ANY OTHER INVESTMENT.

I WANT TO ASK YOU A FEW VERY SERIOUS QUESTIONS: WHERE DOES QUALITY STAND IN YOUR COMPANY? ARE YOU TOTALLY COMMITTED TO QUALITY, OR ARE YOU ONLY COMMITTED UNTIL QUALITY GETS IN THE WAY OF COST, SCHEDULE, OR PERFORMANCE? ARE YOU WILLING TO DELAY RECEIPT OF A PROGRESS PAYMENT TO DELIVER A QUALITY PRODUCT?

LADIES AND GENTLEMEN, I HOPE ALL YOUR ANSWERS WERE POSITIVE, BECAUSE WE CAN NO LONGER ACCEPT A BUSINESS

AS USUAL ATTITUDE. THERE MUST BE DRASTIC CHANGES!  
THERE MUST BE A TOTAL COMMITMENT TO QUALITY PRODUCTS.  
THERE MUST BE A QUALITY REVOLUTION!

THE QUALITY OF AMERICAN PRODUCTS HAS BEEN OUTPACED  
BY THE QUALITY IMPROVEMENTS OF FOREIGN INDUSTRIES,  
PARTICULARLY JAPAN. LET ME OFFER A FEW COMPARISONS.  
BUT FIRST LET ME SAY A WORD ABOUT THE "OTHER JAPAN'S"  
WHO ARE DEVELOPING CORPORATE STRATEGIES CENTERED ON A  
COMMITMENT TO QUALITY. BELIEVE ME, THEY ARE MAKING  
ADDITIONAL INROADS INTO THE U.S. DEFENSE MARKET.

I HAVE ALREADY SEEN THE FIRST SIGNS. NOT LONG AGO  
A GERMAN SHIPBUILDER PLACED A HALF-PAGE AD IN THE  
WASHINGTON POST OFFERING US THE OPPORTUNITY TO BUILD  
THEIR SUBMARINE UNDER LICENSE. MY ASSISTANT FOR  
PRODUCT ASSURANCE RECENTLY ATTENDED AN EXPOSITION OF THE

LATEST QUALITY TECHNOLOGY EQUIPMENT WHERE HE FOUND THAT FIFTY PERCENT OF THE EQUIPMENT WAS DESIGNED AND MANUFACTURED OVERSEAS AND FULLY HALF OF THE IMPORTS WERE FROM EUROPE.

NOW BACK TO THE COMPARISONS. JAPANESE FIRMS HAVE LEARNED TO DESIGN AND BUILD QUALITY IN, WHILE AMERICAN FIRMS ARE STILL TRYING TO INSPECT IT IN. UNFORTUNATELY, NEITHER THE AIR FORCE NOR YOUR COMPANY CAN AFFORD THE PRICE TAG OF INSPECTING QUALITY IN TO MAKE UP FOR INEFFICIENT MANAGEMENT AND MANUFACTURING PROCESSES. SAID ANOTHER WAY, THE AIR FORCE SYSTEMS COMMAND IS DISSATISFIED WITH THIS RELIANCE ON INSPECTION AND THE RESULTING COSTS.

AS TO THE JAPANESE, DEDICATION TO QUALITY PERMEATES EVERY ASPECT OF THEIR OPERATIONS. THEY LEAVE NO STONE

UNTURNS. EVERYTHING IS COMBINED INTO A "NO WASTE" ETHIC. THEY CONSIDER ANY TIME AND MATERIAL LOST TO POOR QUALITY AS PART OF WASTE. THEIR GOAL IS TO ELIMINATE WASTE. IN AMERICA, ON THE OTHER HAND, WE BELIEVE PERFECTION IS UNOBTAINABLE.

LET ME GIVE YOU SOME STARTLING INFORMATION: MORE THAN ONE HALF OF OUR TOTAL QUALITY COST IS GENERATED BY THE INSPECTION PROCESS. UNFORTUNATELY, YOU CAN NEVER CATCH EVERYTHING NO MATTER HOW MUCH YOU INSPECT. A SURVEY OF TWENTY-ONE AIR FORCE CONTRACTORS REVEALED THAT THEY WERE PROCESSING OVER 370,000 MATERIAL REVIEW ACTIONS PER YEAR. ONE COMPANY WAS PROCESSING OVER 1800 MATERIAL REVIEW ACTIONS PER MONTH WITH A SCRAP AND REWORK COST OF \$275,000. THIS EQUATES TO OVER THREE MILLION DOLLARS PER YEAR. IS ANY COMPANY SO BIG NOW

THAT IT CAN'T BE BOTHERED WITH THREE MILLION DOLLARS? CERTAINLY NOT!

IN JAPAN, THEY NOT ONLY STRIVE TO ELIMINATE WASTE, THEY BELIEVE ALL ERRORS CAN BE PREVENTED. THEIR SUCCESS IS PHENOMENAL--ONE COMPANY CAN TURN OVER ITS INVENTORY A HUNDRED TIMES IN A YEAR WITH NO INVENTORY LOSSES. SOME COMPANIES EVEN OPERATE AUTOMATED LINES WITHOUT BACKUP STATIONS FOR REWORK AND REPAIR.

HOW DID JAPAN ESTABLISH ITSELF AS TODAY'S ROLE MODEL FOR QUALITY PRODUCTS? CERTAINLY NOT THROUGH CHEAP LABOR, ABUNDANT RAW MATERIALS, CULTURAL DIFFERENCES, OR HAVING A GOOD GEOGRAPHIC LOCATION. A HIGHLY MOTIVATED WORK FORCE AND GOVERNMENT ENCOURAGEMENT CONTRIBUTED, OF COURSE. MANAGEMENT EMPHASIS ON SUCH THINGS AS GOOD LABOR PRACTICES, CAPITAL INVESTMENT, HIGH TECHNOLOGY,



EFFICIENT PRODUCTION PRACTICES, MATERIAL YIELD, QUALITY CONTROL, AND INVENTORY CONTROL HELPED AS WELL. BUT THE BOTTOM LINE IS SIMPLE--THEY TOOK AMERICAN TEACHERS, AMERICAN IDEAS AND AMERICAN EQUIPMENT AND MADE THEM WORK.

THERE'S MORE! THE MOST PHENOMENAL SUCCESS IS IN SUPPLIER MANAGEMENT. SOME JAPANESE COMPANIES NOW OPERATE WITH VIRTUALLY NO RECEIVING INSPECTION, COUNT VERIFICATION, OR SHIPPING AND RECEIVING DOCKS. SUPPLIER ITEMS ARE ROUTINELY DELIVERED DIRECT TO THE PRODUCTION LINE CRIBS. THIS WOULD OBVIOUSLY BE IMPOSSIBLE WITHOUT SUPREME CONFIDENCE ACROSS THE BOARD IN MANUFACTURING QUALITY.

HOWEVER, THE KEY CONCEPT IS VENDOR INTEGRITY, WHICH THE JAPANESE PRIME MANUFACTURER TAKES AS A GIVEN. THIS IS 180 DEGREES FROM OUR DEFENSE ACQUISITION

PRACTICES, PRACTICES WHICH DRIVE US TO RELY ON COSTLY INSPECTION.

I'M NOT SAYING YOU CAN GET RID OF YOUR RECEIVING INSPECTION TOMORROW, BUT THE FIRST STEP IS TO CONFRONT YOUR VENDORS WITH HARD EVIDENCE OF THE COST THEIR POOR QUALITY IMPOSES ON YOUR COMPANY.

LET'S EXAMINE THIS FOR A MOMENT. I FIND THAT OUR TOLERANCE OF THIS SITUATION HAS CAUSED LAXITY IN SUBCONTRACTOR MANAGEMENT AND THIS IS AN EXTREMELY IMPORTANT AREA AS IT'S COMMON FOR FIFTY PERCENT OF THE CONTRACT VALUE TO BE PRODUCED OUTSIDE THE PRIME'S PLANT. HOW MANY OF YOU KNOW THE DOLLAR IMPACT OF POOR VENDOR QUALITY ON YOUR OPERATIONS? AS FAR AS I KNOW, ONLY ONE OR TWO COMPANIES HAVE ACCEPTED THE CHALLENGE OF RATING VENDORS IN TERMS OF DOLLAR IMPACT. IN FACT, JUST THE OPPOSITE SEEMS TO BE THE RULE.

FOR EXAMPLE, ONE U.S. COMPANY'S SOLUTION TO POOR  
VENDOR QUALITY WAS TO BUILD AN ENTIRE TEST CENTER FOR  
VENDOR PARTS. I DON'T CARE HOW MANY PEOPLE YOU HAVE OR  
HOW MUCH INSPECTION EQUIPMENT YOU BUY, IF THE QUALITY  
ISN'T DESIGNED AND BUILT IN, IT WON'T MAGICALLY APPEAR  
BY HAVING SOMEONE INSPECT IT.

BUT, THE REAL QUESTION IS WHY PRIME CONTRACTORS ARE  
NOT LIVING UP TO THEIR RESPONSIBILITY FOR INSISTING ON  
SUPPLIER QUALITY. I BELIEVE THAT IF WE IN GOVERNMENT  
DIDN'T PERFORM SOURCE INSPECTIONS IN VENDOR'S PLANTS OR  
REFUSED TO PAY FOR MISTAKES, THEN WE WOULD SEE A REAL  
QUALITY REVOLUTION--AND SOON!

LADIES AND GENTLEMEN, AIR FORCE SYSTEMS COMMAND CAN  
NO LONGER AFFORD THE ANNUAL COSTS ASSOCIATED WITH THE  
"HIDDEN PLANT."

WHAT IS THIS "HIDDEN PLANT"--THE TERM COINED BY DR. ARMAND V. FEIGENBAUM? WELL, WHEN I SAY HIDDEN PLANT, I AM TALKING ABOUT ALL OF THE THINGS THAT EXIST AS A RESULT OF YOUR NONCONFORMANCES IN MANUFACTURING.

HOW MANY OF YOU HAVE ENTIRE BUILDINGS OR SECTIONS IN YOUR PLANTS IN WHICH MACHINES AND PERSONNEL ARE TOTALLY DEDICATED TO CORRECTING DEFECTS? UNFORTUNATELY, THE PEOPLE THAT WORK IN THESE SHOPS TEND TO BE THE MORE HIGHLY SKILLED WORKERS.

THIS LEAVES THE IMPRESSION THAT A MANAGEMENT POLICY EXISTS CALLING FOR THE BEST WORKERS TO CORRECT THE MISTAKES OF OTHERS RATHER THAN USING THEM AS EXAMPLES AND TEACHERS SO THE WHOLE WORK FORCE IS DEDICATED TO BUILDING IT RIGHT THE FIRST TIME.

I AM DEEPLY CONCERNED ABOUT THE HIDDEN PLANT IN AMERICA'S DEFENSE INDUSTRY. I AM TOLD THAT THE CONTRACTORS MONITORED BY OUR CONTRACT MANAGEMENT DIVISION WASTE A MINIMUM OF \$570 MILLION PER YEAR ON POOR QUALITY. IF WE EXTRAPOLATE IT TO THE ENTIRE DEFENSE ACQUISITION EFFORT, WE ARE TALKING ABOUT BILLIONS EVERY YEAR IN LOST BUYING POWER.

IF I MAY BORROW A THOUGHT FROM THE LATE SENATOR DIRKSEN, IF YOU SAVE A BILLION HERE AND A BILLION THERE, PRETTY SOON IT WILL ADD UP TO REAL MONEY.

LET'S LOOK A LITTLE CLOSER AT THIS \$570 MILLION HIDDEN PLANT FIGURE. IT INCLUDES ONLY THOSE ITEMS DIRECTLY ATTRIBUTED TO SCRAP, REWORK AND REPAIR AT THE PRIME CONTRACTOR'S FACILITY. IT DOES NOT INCLUDE THE PRIME CONTRACTOR'S MORE UNOBTRUSIVE HIDDEN PLANT MADE

UP OF WORK-AROUNDS, REMOVE AND REPLACE OPERATIONS, EXCESSIVE INVENTORIES TO COMPENSATE FOR POOR QUALITY, INFLATED OVERHEAD FROM THE EXTRA EFFORT, AND SCHEDULE DELAYS. NOR DOES IT ACCOUNT FOR ANY OF THE HIDDEN PLANT AT THE VENDOR LEVEL.

WHAT'S EVEN MORE DISTURBING IS THAT THE RATE OF SCRAP, REWORK AND REPAIR AS A PERCENT OF TOTAL SALES HAS INCREASED 60 PERCENT SINCE 1976.

NOR DOES THIS FIGURE ADDRESS COSTS INCURRED BY THE AIR FORCE TO CORRECT QUALITY FAILURES OCCURRING IN FIELD OPERATIONS. A RECENT EXAMPLE IS THE SINGLE PROBLEM ON AN ENGINE WHICH REQUIRED 11,000 MANHOURS TO CORRECT. OUR MAINTENANCE RESOURCES ARE TOO SCARCE TO PUT UP WITH THIS. THIS EXAMPLE AND MANY OTHERS LIKE IT CLEARLY PROVE THAT INSPECTIONS CAN'T CATCH EVERYTHING. YOU MUST BUILD IT RIGHT THE FIRST TIME!

THIS MEANS A DIRECT IMPROVEMENT IN YOUR FIRST TIME PRESENTATION ACCEPTANCE RATE OR MANUFACTURING YIELDS. FAILING TO MAKE A SERIOUS ATTEMPT IN THIS AREA WHEN THE COST OF MONEY IS SO HIGH AND AMERICA'S QUALITY IMAGE IS UNDER FIRE IS A BREACH OF TRUST WITH THE AMERICAN TAXPAYER AND STOCKHOLDERS.

I RECOGNIZE THAT THIS APPROACH STRIKES AT THE FOUNDATION OF GOVERNMENT CONTRACTING WHERE PROFIT IS BASED ON COST. WE ARE EXPLORING ACCEPTABLE ALTERNATIVES TO THIS CONCEPT. YOU CAN EXPECT THAT COST EFFICIENCY WILL HAVE A ROLE IN ANY NEW ALTERNATIVES. WE RECOGNIZE THAT OUR CONTRACTS MUST MOTIVATE YOU TO IMPROVE PRODUCT QUALITY WHILE REDUCING COSTS!

BY NOW, IT SHOULD BE CLEAR THAT WE HAVE A PROBLEM . NOW, WHY SHOULD WE BE CONCERNED? THE ANSWER IS IN

THREE PARTS--SAVINGS, PRODUCTIVITY AND USER SATISFACTION AND CONFIDENCE.

FIRST. WE IN DEFENSE ACQUISITION WILL NO LONGER TOLERATE THE ERODED BUYING POWER OF THE HIDDEN PLANT-- NOT TO MENTION STOCKHOLDERS VIEWS OF LOST PROFITS.

THE PRESIDENT HAS COMMITTED THE COUNTRY TO IMPROVING NATIONAL DEFENSE. IN THESE TIMES OF TIGHT BUDGETS, THIS MEANS WE MUST REDOUBLE OUR EFFORTS TO ENSURE EVERY DOLLAR IS WELL SPENT. WE CAN ILL AFFORD TO SPEND TAXPAYERS' HARD EARNED DOLLARS TO DO THE SAME JOB OVER AND OVER AGAIN.

SECOND, IMPROVING QUALITY HAS A SIGNIFICANT IMPACT ON PRODUCTIVITY. LOOK CLOSELY AT QUALITY NONCONFORMANCES AND YOU WILL SEE HOW MANY HOURS ARE SPENT CORRECTING JUST A SINGLE PROBLEM. LOOK CLOSELY AT MANUFACTURING



YIELDS AND I BELIEVE YOU'LL AGREE THAT INDUSTRY USES MATERIAL REVIEW ACTIONS AS A CRUTCH TO MEET SCHEDULE GOALS AND AS AN EXCUSE WHEN THESE GOALS ARE MISSED.

THE THIRD PART OF THE ANSWER IS USER SATISFACTION AND CONFIDENCE. WITHOUT A QUALITY PRODUCT, OUR ABILITY TO MAINTAIN FORCE READINESS IS SEVERELY HAMPERED. EVERY TIME WE GROUND A FLEET, WE RISK SENDING OUR TROOPS INTO BATTLE WITHOUT CONFIDENCE IN THEIR WEAPON SYSTEMS. EVERY TIME A DETECTION SYSTEM OR MAJOR COMMUNICATION SYSTEM BREAKS DOWN, WE RUN THE RISK OF POOR DECISIONS BASED ON INCOMPLETE INFORMATION.

I CAN'T TOLERATE THIS BECAUSE I AM FIRMLY COMMITTED THAT AIR FORCE SYSTEMS COMMAND WILL PROVIDE HIGH QUALITY PRODUCTS TO THE USING COMMANDS. I INSIST THAT WHEN AN AIRMAN PUTS ON A PARACHUTE, CLIMBS INTO AN AIRPLANE, OR

FIRES A MISSILE, THE POSSIBILITY OF EQUIPMENT FAILURE MUST NOT BE ONE OF HIS WORRIES. HOWEVER, I CAN'T ACHIEVE THIS GOAL WITHOUT YOUR COMMITMENT.

THE STAKES ARE HIGH, LADIES AND GENTLEMEN. FOR THIS REASON WE MUST SOLVE THIS PROBLEM THROUGH IMPROVED SYSTEM QUALITY, NOT THROUGH FANCY INSPECTION PROCESSES OR ADDED SYSTEM REDUNDANCY.

I CHALLENGE YOU TO NOT ONLY TALK QUALITY TO YOUR MANAGEMENT PEOPLE AND VENDORS, BUT TO WORK WITH LABOR AS WELL. SURVEYS HAVE SHOWN THAT WORKERS WOULD GET GREATER JOB SATISFACTION IF MANAGEMENT WOULD ALLOW THEM TO MAKE A QUALITY PRODUCT RATHER THAN PUSHING PRODUCTS OUT THE DOOR TO MEET DELIVERY SCHEDULES. YOU HAVE TO DEVELOP THAT COMBINATION OF PRIDE AND SUCCESS. I THINK YOU WILL FIND THAT THEY COMPLEMENT EACH OTHER. HOW DOES THE AD GO? "AT FORD, QUALITY IS JOB 1."

YOU MIGHT BE SURPRISED WHAT A GENUINE COMMITMENT FROM MANAGEMENT WILL DO FOR QUALITY AND PRODUCTIVITY INITIATIVES. LABOR, HOWEVER, IS VERY CONCERNED TODAY THAT PLANT MODERNIZATION WILL RESULT IN THEIR PEOPLE BEING DISPLACED RATHER THAN RETRAINED TO MEET NEW SKILL REQUIREMENTS. ONLY YOUR ACTIONS CAN DISPEL THAT FEAR.

YOU MUST TELL YOUR PEOPLE QUALITY IS IMPORTANT, AND YOUR ACTIONS MUST BACK UP YOUR WORDS. LET ME ASK YOU SOME MORE HARD QUESTIONS: HOW MANY QUALITY ENGINEERS HAVE EVER BEEN VICE PRESIDENT FOR ENGINEERING IN YOUR COMPANY? HOW MANY OF YOUR MANUFACTURING QUALITY PEOPLE HAVE EVER BEEN YOUR CHIEF OPERATIONS OFFICER? HOW MANY COMPANY PRESIDENTS HAVE COME FROM QUALITY BACKGROUNDS? HOW MANY OF YOUR EXECUTIVE COMPENSATION PACKAGES ARE TIED TO PRODUCT QUALITY?

I HAVE BEEN USING THE PRONOUN "YOU" A LOT, BUT I DON'T MEAN TO SOUND AS IF YOU'RE IN THIS ALONE. WE ARE BASICALLY ARMS-LENGTH PARTNERS. WHEN ONE PARTNER MAKES A MISTAKE, THE OTHER USUALLY ENDS UP SHARING THE CONSEQUENCES, AT LEAST THE LOSS. PARTNERSHIPS TEND TO BE THE WEAKEST BUSINESS RELATIONSHIPS BECAUSE THE PARTNERS' OBJECTIVES AREN'T ALWAYS CONSISTENT.

I RECOGNIZE YOUR OVERALL OBJECTIVE IS TO EARN THE BEST RETURN YOU CAN ON YOUR INVESTMENT. OUR OBJECTIVE IS TO ACQUIRE WEAPON SYSTEMS WHEN PROMISED--WEAPONS THAT PERFORM EXACTLY AS ADVERTISED AND ARE ECONOMICAL TO OPERATE AND SUPPORT. THESE OBJECTIVES NEED NOT BE DIAMETRICALLY OPPOSED.

FOR OUR PART, MY STAFF IS FOCUSING SEVERAL QUALITY IMPROVEMENT EFFORTS INTO A CLOSED LOOP SYSTEM. AT THE FRONT END, WE WILL INSTITUTIONALIZE THE EMPHASIS OF THE "ILITIES" IN DESIGN.

WE ARE WORKING TOWARDS CONTRACTUAL TOOLS THAT WILL DEMAND MORE RIGOROUS ANALYSIS OF THE QUALITY EXPERIENCE IN FULL SCALE DEVELOPMENT AND THE BEGINNING OF PRODUCTION. THIS ANALYSIS WILL FORM THE BASIS FOR EVALUATION OF THE MANUFACTURING EFFORT DURING PRODUCTION WITH COMMENSURATE REWARDS FOR EXCELLENT PERFORMANCE.

WE ARE ALSO LOOKING AT WAYS TO CURTAIL THE CURRENT WIDESPREAD USE OF MATERIAL REVIEW BOARDS, WAIVERS, DEVIATIONS, AND UNNECESSARY GOVERNMENT SOURCE INSPECTION. YES, THIS ALSO MEANS THAT QUALITY WEAPON SYSTEMS ARE OUR OBJECTIVE; NONCONFORMING WEAPON SYSTEMS EVEN WHEN DELIVERED ON TIME WILL NOT CUT THE MUSTARD ANY LONGER. BOTH THE AIR FORCE AND INDUSTRY MUST WORK TOGETHER TO CHANGE OUR PRIORITIES AND PUT QUALITY AHEAD OF SCHEDULE.

THERE WILL ALSO BE INCENTIVES FOR FIELD PERFORMANCE. WE ARE DEVELOPING A FEEDBACK SYSTEM TO

COMMUNICATE DIRECTLY WITH THE USING COMMANDS AT THE MAJOR HEADQUARTERS LEVEL. CONTRACTOR QUALITY HISTORY WILL BE MAINTAINED AND HAVE A DIRECT IMPACT ON SELECTION FOR NEW CONTRACTS.

YOU HAVE HEARD THE WORD COMMITMENT SEVERAL TIMES DURING THIS PRESENTATION. THIS WAS INTENTIONAL. COMMITMENT IS THE KEY INGREDIENT TO MAKING IMPROVEMENTS IN QUALITY. BUT, WE MUST ALL REMEMBER THAT COMMITMENT IMPLIES ACTION.

ALL OF YOU ARE PROBABLY FAMILIAR WITH ADMIRAL RICKOVER'S RECENT TESTIMONY TO CONGRESS. HE SPOKE OF THE "SAY-DO" SYNDROME WHERE WE MAKE STATEMENTS AND TAKE CREDIT FOR ACTION THAT HASN'T BEEN ACCOMPLISHED. THEN, THERE IS NEVER ANY FOLLOWUP TO ENSURE ACTION. COMMITMENT WITHOUT ACTION IS AN EMBARRASSING WASTE OF HOT AIR.

I HAVE MADE MY COMMITMENT TO QUALITY EXCELLENCE. I HAVE JUST INITIATED A QUALITY IMPROVEMENT PROGRAM WITHIN MY COMMAND. THIS WILL BE A COMPREHENSIVE PROGRAM TO DRIVE IMPROVEMENTS IN QUALITY AND PRODUCTIVITY THROUGHOUT THE AFSC WORK FORCE. IN SUPPORT OF THIS EFFORT, MY DIVISION COMMANDERS ARE BEING ASKED TO STEP UP TO OUR COUNTRY'S PRODUCTIVITY/QUALITY PROBLEM AND FORCE THE NEEDED IMPROVEMENT.

I WILL ALSO REQUEST AIR FORCE CONTRACTORS MAKE A COMMITMENT FOR QUALITY EXCELLENCE. THIS INCLUDES IMPLEMENTING A FORMAL QUALITY IMPROVEMENT PROGRAM BASED ON CURRENT QUALITY LEVELS, ESTABLISHING GOALS, MEASURING ACHIEVEMENTS AND REPORTING RESULTS TO ME. I AM SERIOUS ABOUT QUALITY IMPROVEMENT AND I EXPECT YOU TO BE ALSO.

THE THEME OF THIS CONFERENCE IS "THE BOTTOM LINE". IN THE DEFENSE BUSINESS, THE BOTTOM LINE IS A MIX OF SYSTEMS POSSESSING THAT COMBINATION OF QUALITY AND HIGH TECHNOLOGY THAT DETERS WAR; OR, FAILING DETERRENCE, PROVIDES A CLEAR, DECISIVE EDGE FOR VICTORY.

THE U.S. HAS THE FINEST TECHNOLOGY IN THE WORLD, BUT IF WE CAN'T OR DON'T GET IT THROUGH THE HANGAR OR GARAGE DOOR, OUR NATIONAL DEFENSE POSTURE WON'T BE CREDIBLE IN THE EYES OF OUR ALLIES, MUCH LESS OUR ENEMIES.

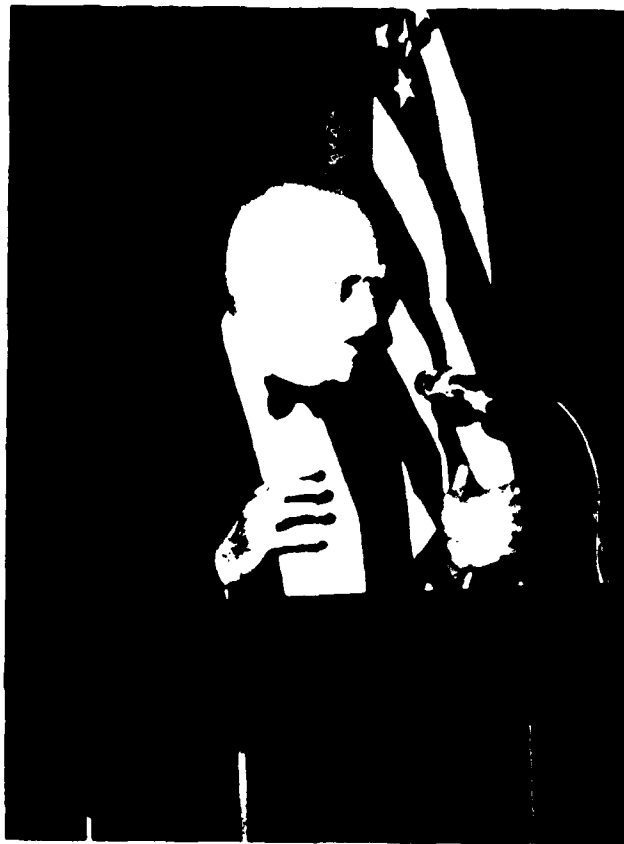
IN CLOSING I THANK YOU FOR YOUR ATTENTION. MORE IMPORTANT THOUGH ARE IS YOUR FOLLOW-ON ACTIONS. YOUR MANAGEMENT ACTIONS, AS WELL AS MINE, SPEAK LOUDER THAN ANY OF OUR SPEECHES. IT IS CRITICAL FOR TOP MANAGEMENT TO USE THE QUALITY ASSURANCE TECHNIQUES AVAILABLE TODAY



TO UPGRADE THE QUALITY OF OUR PRODUCTS. MAKE YOUR COMMITMENT TO QUALITY AND THEN DO SOMETHING ABOUT IT! QUALITY HAS EVOLVED INTO A MAJOR CONSIDERATION IN THE CUSTOMER'S SELECTION PROCESS. SAID ANOTHER WAY, AMERICA IS NOW INVOLVED IN AN INTERNATIONAL ECONOMIC WAR WHERE QUALITY IS PROVING TO BE THE WINNING STRATEGY. THE AUTO INDUSTRY LEARNED THAT LESSON THE HARD WAY.

I SINCERELY HOPE WE, IN THE DEFENSE INDUSTRY, CAN AVOID THEIR DILEMMA. THE AIR FORCE IS NO DIFFERENT THAN THE TYPICAL CONSUMER: QUALITY IS OUR PREFERENCE AND QUALITY--OR PAST PERFORMANCE--WILL PLAY A MAJOR ROLE IN OUR FUTURE ACQUISITION DECISIONS. IF YOU'RE GOING TO CONTINUE TO COMPETE OUR MARKET, YOU MUST STEP UP TO THIS FACT.

BOTTOM LINE CONFERENCE



"Three breaks with tradition:  
Annual Improvement  
Massive Training  
Hands-On Leadership."

DR. J. M. JURAN  
PRESIDENT, JURAN ENTERPRISES

UPPER MANAGEMENT AND QUALITY - A NEW DIRECTION

by J. M. Juran

Presented at "Bottom Line" Conference

National War College

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866 United Nations Plaza  
New York, NY 10017 USA

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## INTRODUCTION

Running through this "Bottom Line" Conference is the theme that:

We face a gathering crisis in product quality.

Our leadership in quality has been eroding.

Upper management must make a positive response.

I subscribe to this theme, but my mission is to get into the specifics of that response. Just what should the companies - and the government - do different than they have been doing? What should upper management do different?

As it happens, I have some useful experience to share with you. In the last few years upper managers in the USA and in the West generally have exhibited an unprecedented level of interest in product quality. They are attending seminars on the subject, in record numbers. Many companies have held one-day, in-house seminars on the subject, with the very top people in attendance: the chairman, president, vice-presidents. These companies have included industrial giants.

These seminars and the associated studies I have made within some of the companies have provided a good deal of case material from which it is possible to generalize. There is of course much variation in the problems faced by the companies and in the responsive actions required of upper management. But there is also much commonality. Three areas of this commonality are so widespread and critical that I will limit my formal remarks to them.

## THREE BREAKS WITH TRADITION

What I have been proposing to upper managers is that they make three breaks with tradition:

1. Launch a program of annual improvement in quality: improvement this year, next year, the following year, forever.
2. Undertake a massive program of training so that the entire management team, not just the quality department, is trained in how to attain, control and improve quality.
3. "Hands-on" leadership by upper management - a personal review by upper managers of the company's approach to quality so as to establish new policies, goals, plans,

Fig.1 - on

organization, measures, controls.

FIG.1 -off

### ANNUAL IMPROVEMENT

I put annual improvement first. It has the shortest lead time and the most obvious return on investment. Let me start with a case example - the ABC Bellwether case.

In the ABC Company a major component X had for years been running at 30% scrap, with an associated cost of \$9 million per year - a bottom line cost. One notorious defect type - Defect Z - contributed a third of that cost - \$3 million.

In my study of the ABC Company I looked to see why so notorious a waste was going on and on. It turned out that an atmosphere of blame had settled in. The key departments were entrenched in defensive positions, with mutual finger pointing. There was no agreement on the cause of Defect Z, so the problem was on dead center.

I was in a position to wash this problem up to the top of the company. The top managers took those key middle managers out of those trenches, put them on the same team, and gave them an ultimatum: cut the cost of Defect Z. The response was superb. Within a year the cost of Defect Z was cut from \$3 million to \$1 million - a saving of \$2 million, right to the bottom line.

FIG.2 -on

It didn't come free. The company had to invest \$0.25 million to refine the process, provide added instrumentation, revise the controls, etc. But the resulting return on investment ran to 800% per annum.

FIG.2 -off

Now let's relate the case of Defect Z to the broader picture of quality in the ABC Company. The pertinent figures are about as follows:

FIG.3 -on

	<u>\$ Million</u>
Sales	1,000
Profit	100
Invested (net worth)	500
Cost of poor quality	200

Following the success in reducing the cost of Defect Z it became easy to convince upper management that the \$200 million cost of poor quality could be cut in two by extending the same approach across the entire company. That would yield a profit increase of about \$100 million. But it would take about 5 years to bring this about. And it

would not be free. To save 50 times as much as was saved on Defect Z would probably take 50 times the investment, or \$12.5 million.

What intrigued the upper managers the most was the contrast in investment. They now had two roads for increasing profit by \$100 million.

1. Cut the cost of poor quality in two. That road would require an investment of about \$12.5 million.

2. Double the company's sales. That road would require an investment of about \$500 million.

It was obvious that for the next five years the best way to improve return on investment would be to improve quality. The upper managers took action. They launched a major program of annual quality improvement. All divisions are required to identify and schedule quality improvement projects annually. For each project they assign clear responsibility for bringing that project to completion. The upper managers follow all this through a system of progress reports. In my view they are headed for spectacular results.

FIG.3 -off

Now let's identify the key steps taken by the ABC Company to get on the road to annual quality improvement. These key steps consisted of:

FIG.4 -on

1. The Bellwether project
2. Use of the language of management
3. The project concept, and an end to exhortation
4. The organized approach to annual improvement.

Let's look at these in a bit of detail.

FIG.4 -off

1. The Bellwether project. The Defect Z project proved that the ABC Company could get a big return on investment by improving quality. "It happened right in our own company." This in-house project was more convincing to results-oriented managers than any amount of lectures, books or success stories about other companies.

2. The language of management. The upper managers had often been told that the company was enduring a lot of scrap, rework, field failures, etc. However, this information was presented mainly in technological language, so

it did not succeed in stimulating the upper managers to action. The turning point came when the facts and extrapolations were presented in the language of management - the language of money. The upper managers had never before seen so clearly that for the next five years, improvement in quality could do more for the company's progress than growth in sales. Fig.5 -on

Fig.5 -off

3. The project concept; an end to exhortation.  
In the ABC Company the problem of poor quality had for years been the target of exhortations by upper management. "Let's improve." But there is no such thing as improvement in general. All improvement takes place project by project and in no other way. The ABC train of action started when Defect Z was singled out as a project, and specific managers were given responsibility for results.

So, managers do not accept this line of reasoning. To ease, some presidents convene their vice-presidents to explain the need to improve quality and reduce the costs of waste. They also give the vice-presidents a goal: during the coming year, reduce the cost of poor quality by 5%. These presidents then contend: "I've done my job. I explained the need and set the goal. Now it's up to them."

In some of these companies I have tracked what took place. Typically, the vice-presidents gave the same goals to their subordinate managers, who transmitted the goals to their subordinates, and so on right through the hierarchy. Everyone got the message. Everyone was given the goal. But not much happened.

Let's contrast this approach with the way these same companies handle their annual operating plan. This contrast will bring us to the fourth key step taken by the ABC Company - the organized approach to annual improvement.

Fig.6 -on

#### THE ANNUAL OPERATING PLAN

In preparing this plan the companies start with broad goals for sales, growth, profit, etc.

Next they list the specific deeds to be done to meet those goals:

Sell X units of product

Make Y units of product

- Train needed personnel
- Acquire materials
- Provide facilities
- Develop certain new products
- Upgrade certain facilities
- Make certain acquisitions

Next they translate these deeds into money to see what will be the financial consequences of doing those deeds.

Then they cut, fit and finalize.

The end result is published and becomes the formal financial budget.

The companies also establish clear responsibilities - they make clear which managers are responsible for performing which deeds.

In addition, the companies establish a system of reports to inform the managers of progress or lack of progress.

Finally, the upper managers review progress against goals and take remedial action as needed.

Now note the resulting aura of formality and legitimacy.

Managers who have the responsibility for doing those deeds also have an associated set of rights - a legitimacy to call meetings, to receive pertinent information, to be a party to pertinent discussions, etc., as needed to carry out those responsibilities.

Now let's compare the elements of such an annual operating plan with the exhortation approach. In the exhortation approach there is sometimes a clear goal but there is no meeting of the minds on what deeds are to be done to meet the goal; no clear assignment of responsibility; no legitimacy; no way for upper management to review progress against goals.



Over the years we have established a good record of meeting our annual operating plans. I believe the main reason is that years ago we abandoned the exhortative approach, and adopted instead an approach based on identifying deeds, establishing clear responsibilities, providing for review of progress, etc. In contrast, our record of annual quality improvement is poor. I believe the main reason is that we have clung to the exhortative approach.

FIG.6 -off

#### 4. The organized approach to annual improvement

We have seen that this approach should embody the broad features of the annual operating plan. However, there are some concepts which are special to improvement, and we should look at these.

Chronic vs. sporadic. In quality improvement the list of deeds to be done is a list of projects for improvement. These projects are concerned with specific chronic problems, e.g. scrap due to Defect Z. The emphasis is on chronic problems, not sporadic problems.

FIG.7 -on

In our model a sporadic problem is represented by that "spike" which sticks out above the usual level of performance. Every such spike is an interference with our regular way of life. Some of the instances presented at this conference are shocking. They have delayed important programs, disrupted important plans, wasted the taxpayers' money. None of us wants any recurrence of such outrages.

However, the bulk of our quality troubles and costs have their origin in chronic levels of poor quality which have persisted for years. In our model, the chronic level is represented by the area under the usual or "standard" level. If we could reduce that chronic loss from say 10% of sales to 1% of sales we would end up with a big gain which would go on and on.

A case in point is the cost of poor quality in steel companies. In our companies this cost stands at about 10% of sales compared to about 1% for Japanese steel companies.

FIG.7 -off

Organization. Annual improvement requires a continuing organization structure to choose the projects and see that they are brought to completion. Such organization typically consists of:

FIG.8 -on

A council or committee to formulate policy and provide broad oversight.

Subordinate committees as needed.

A structured approach for soliciting nominations for next year's projects.

Machinery to screen the nominations and agree on next year's projects.

A charter spelling out the rights and responsibilities of the project teams.

Appointment of project teams.

A system of progress reports.

Provision for upper management review.

FIG.8 -off

FIG.9 -on

The universal sequence of events. Managers who are to engage in improvement year after year should understand thoroughly the anatomy of improvement. Surprisingly, all improvement (or breakthrough) follows a universal sequence of events. This sequence is well documented in the literature as well as in training texts, seminars and video cassettes.

FIG.9 -off

## TRAINING

Now let me turn to the second break with tradition - training. The training I am talking about relates to training in the "quality disciplines" - a body of concepts, tools and skills through which we attain, control and improve quality.

To explain what I mean by quality disciplines, let me use an analogy - the financial analogy.

In order to establish and meet financial goals our companies make use of a wide variety of finance-oriented disciplines:

Concepts such as investment, profit, return on investment.

Tools, e.g. budgets, balance sheets, profit statements, cost controls.

An infrastructure including basic data sheets,

charts of accounts, bookkeeping, data processing.

Skills, e.g. techniques, training.

Companies which make full use of these finance disciplines are better able to establish and meet financial goals than companies which make little use of these finance disciplines.

Use of these finance disciplines requires that the managers in the company have the prerequisite training. But let us notice that much depends on which managers have this training. Consider two companies, A and B.

In company A, the finance department is well trained in the finance disciplines, but no one else is - not the line managers, not the upper managers.

In company B, not only does the finance department have such training; so do the line managers and so do the upper managers.

Which company will get the best financial results?

Notice also that here in the USA it is quite common for our upper managers to be well trained in these financial disciplines. As a result, the president or general manager is personally able to diagnose the company's position with respect to finance and make a sensible decision as to what course to follow. Furthermore, if this same general manager moves to a different division, or even to a different company, he is still able to diagnose the financial situation and make a sensible decision as to which course to follow.

Now let's get back to quality.

In order to establish and meet quality goals our companies can make use of a wide variety of quality-oriented disciplines, including concepts, tools, an infrastructure and skills. Companies which make full use of these quality disciplines are better able to establish and meet quality goals than companies which make little use of these quality disciplines.

The quality disciplines are applicable to all functions in the company. To illustrate:

In product development use can be made of: design reviews; quantification of variability; quantification of

FIG.10 -on

FIG.10 -off

reliability; failure mode and effect analysis; statistical design of experiment; analysis of variance.

In vendor relations, use can be made of: quantification of process capability; statistical sampling tables; vendor surveys, audits and ratings.

In manufacture, use can be made of: quantification of process capability; control charts; statistical design of experiment; analysis of variance.

Use of these quality disciplines requires that the managers in the company have the prerequisite training. But much depends on which managers have this training. Consider two companies, A and B.

In company A, the quality department is well trained in the quality disciplines. But no one else is - not the line managers, not the upper managers.

In company B, not only does the quality department have such training; so do the line managers and so do the upper managers.

Which company will get the best quality results?

Now let me add a chilling reality: training in American companies follows the pattern of company A; training in Japanese companies follows the pattern of company B.

The Japanese program of formal training in management of quality started in the early 1950's, and it started at the top. They then undertook a massive program to extend this training through the entire hierarchy. It took about 10 years and a big investment. But it made them the best trained managers on earth with respect to managing for quality. I see no way for American companies, with only 5% of their management team trained in the quality disciplines, to be able to compete with Japanese companies which have virtually 100% of the management team trained in the quality disciplines. The disparity is simply too great.

A serious consequence of this disparity in training is the dilemma faced by our top managers. Here we are in a crisis atmosphere with respect to quality. Some top managers feel the need for action now - for choosing a new direction for the company. We saw that in the case of the finance disciplines they are well trained and hence are well poised to choose a sensible direction for the com-

FIG.11 -on

FIG.11 -off

pany. But most of them have no such training in the quality disciplines and hence are not nearly as well poised to choose a sensible direction for the company.

I am on the receiving end of a good deal of feedback as to what is going on out there. I can tell you flatly that along with extensive groping, some stampeding is taking place, and some tragedies are in the making. Some highly regarded companies are rushing to apply narrow spectrum remedies without knowing what is the disease. Here is a list of a few narrow spectrum tools which are being most widely adopted as panaceas:

Statistics. The resurgence of statistical quality control is a direct result of the widely viewed NBC videocast: "If Japan Can, Why Can't We?" How many of you would hire a team of NBC journalists and editors to become your management consultants?

QC Circles. This Japanese invention is undergoing an explosive growth in our companies. When well done it has much merit and is cost effective. But it did not make any major contribution to the Japanese quality revolution and it will not do so here.

Quality cost analysis. This is an enlargement of the accounting system to learn with precision how much is the waste and where. But in the absence of an organized approach to annual improvement, such quality cost analysis is a costly, time consuming and futile exercise.

Motivate the work force. This is a rerun of the noisy spectacles of the 1960's, complete with propaganda, posters, banners, slogans and "Zero Defects Day", exhorting everyone to do perfect work.

There is an element of plausibility and value in every one of these things. But each is a narrow use tool, with a limited range of application. When upper managers adopt such tools as panaceas, the real problems just go on and on. In due course the upper managers mend their ways and change direction. But meanwhile they have lost a few years of time and much credibility in the eyes of the rest of their management team.

#### A PLANNED APPROACH TO TRAINING

How should a company go at it to train the entire management team in the quality disciplines? Let us first note that it took the Japanese 10 years and that it will likely

take us from five to ten years to carry out such training for the entire hierarchy. Such an undertaking merits thorough planning.

My proposals to companies have been that they set up a task force to do this planning. The task force membership should include the training manager, the quality manager, and representatives from the major line and staff departments. The task force then has the mission to:

Identify the training needs - the curriculum - for each category of manager

Propose a program for meeting these needs, including

Sources of training materials

Sources of leaders

The budget

The time table.

We are talking of a massive training program - an order of magnitude beyond our efforts to date. The investment will in any case be substantial. We can minimize the logistical and budgetary problems by preparation of in-house training materials - books and video cassettes. These can be supplemented by such selected outside materials as the task force finds appropriate.

FIG.12 -off

#### HANDS-ON LEADERSHIP

In our discussion on training I noted that some tragedies are in the making because some of our companies are applying remedies without first knowing what are the diseases. Some upper managers protest this. They feel that they have ample information about diseases: high cost of poor quality; declining market share; etc. The point is that their information relates to symptoms. They don't know what are the root causes. When they try to find out they are confronted with numerous conflicting theories. In their efforts to resolve these conflicts they are handicapped by their limited understanding of the quality function and their limited training in the quality disciplines.

What I have been recommending to upper managers is that they become personally involved in the quality function to an extent which qualifies them to take the leadership and to choose a new direction for the company. I have stressed three forms of this involvement:

1. Training in the quality disciplines
2. Participation in improvement projects
3. An audit of the quality function

#### 1. UPPER MANAGEMENT TRAINING IN THE QUALITY DISCIPLINES

The content of such training is exemplified by the topics listed in the 1980 Japanese Union of Scientists and Engineers (JUSE) training course for top management.

FIG.13 -on

Notice the length of the course - four days.

Notice also the content of the course. About 40% of the time is devoted to study of the quality-oriented activities of those departments which have major impacts on quality: product development, quality control, manufacture, purchasing, sales.

Courses on managing for quality have long been available in the USA. (The Japanese courses evolved from American seeds.) More recently there have emerged some courses specially oriented to the needs of upper management. Demand for these courses is burgeoning.

FIG.13 -off

#### 2. PARTICIPATION IN IMPROVEMENT PROJECTS

The company's approach to quality improvement is deficient unless upper management is personally involved in improvement projects.

In part, this involvement is an essential display of leadership in the best sense of that word - leadership by setting an example.

Of even greater importance is the fact that some very important improvement projects are seriously handicapped unless upper management does become involved. We will look at some examples, but first we will set the stage.

FIG.14 -on

This model of the "Spiral" shows the familiar progression of activities through which we bring a product to market. These activities are collectively known as the quality function. In large organizations these activities are departmentalized, and the resulting departments all have an impact on quality.

Our biggest quality problems usually have their origin in some failure to coordinate these departmental activities

so as to optimize overall performance. The realities are that in most companies there is no positive provision for this coordination, and only upper management has the legitimacy needed to fill that vacuum.

FIG.14 -off

Now let's look at some projects which clearly require upper management participation. Our first example deals with allocation of resources.

Years ago the M company brought out a new, patented product which was inherently superior to anything then on the market. The product was widely accepted by industrial users, so sales grew. In addition, the M company was aggressive in designing new features to adapt their basic design to more and more applications. So sales kept growing.

However, the basic M design was prone to field failures, resulting in much client dissatisfaction. Instead of solving the basic design problem, the M company built up a field service force. The clients remained dissatisfied, but they had no choice. The M company's product, despite its failure proneness, was superior to all the competing systems.

It didn't stay that way. In due course the competitors found ways to bypass the patents. They offered high reliability products, and these began to erode the M company's sales.

At the time I had a look, about 85% of the M company's product development force was busy on new design features to create more sales. Meanwhile the company was losing sales at an even greater rate due to lack of allocation of designers to solve the long standing failure proneness. Nothing short of intervention by upper management could get rid of the cancer which was destroying the business.

A second example involves balance among quality parameters.

Not long ago I was asked to give the opening address at the triannual NATO symposium on quality assurance, here in Washington. In preparation for that address I undertook a research study to compare military and civilian approaches to quality on comparable systems. I chose the aircraft engine as a case in point. As things turned out I was unable to secure enough hard data to support a published paper. So I aborted the research and gave a paper on something else. But I learned a good deal all the same. What was most intriguing to me was the contrast in how those two worlds - military and civilian - balanced the competing parameters and closed the essential feedback loops.



Military and civilian upper managers alike are faced with striking a balance among competing parameters, notably performance and operational readiness. In my observation, the forces urging performance - speed, payload, altitude, etc. - had in the military prevailed over the forces urging operational readiness. The resulting engines did indeed have high performance but, in my judgment, too heavy a price had been paid in operational readiness. In contrast, it seemed to me that the airlines had arrived at high engine performance without paying a heavy price in operational readiness.

My conclusions were open to debate - there are important differences in the environments and manner of use of the respective engines. However, there was little room for debate as to the respective approaches to decision making. The airlines had established practical and effective data systems for closing the feedback loop from field performance and maintenance back to the designers and upper management. In my judgment this closing of the loop plus the participation of upper management were decisive in providing the airlines with their balance among the competing parameters.

Yet another type of project for upper management participation involves the concept of historical review of repetitive major undertakings such as development of new products. The purpose is to discover repetitive weaknesses and to take remedial action. What is under study is not product quality, but the process for launching new products.

FIG.15-on

The approach is to appoint an historian whose work is supervised by an interdepartmental team of managers. The historian studies a number of prior projects of new product development. For each he identifies the problems encountered. For each of these problems he logs the symptoms, the causes and the remedies. For the major problems he also estimates the cost incurred due to the problem. The resulting logs may list several hundred problems.

For each problem the historian also logs the associated time frame:

At what stage in the progression of events was the problem first discovered?

At what stage could it have been discovered had things been different?

What changes in the system for launching new designs would have enabled us to avoid the problem altogether or to discover it earlier?

The summary of the logs then points to the major roads for improvement.

It is an exciting concept. It offers a new way to improve some important processes which to date have not been properly studied. In one reported case the time required to bring new products to market was cut in two over a period of five years.

### 3. AN AUDIT OF THE QUALITY FUNCTION

My third recommendation for upper management hands-on involvement is an audit of the quality function - a walk around that Spiral.

This audit consists of a series of reviews of the quality-related activities of the major functions of the company: market research; product development; process development; production; quality control; marketing; field service. Still another such review concerns the company's approach to coordinating all these functions so as to optimize results.

FIG.14 -on  
again

Each of such audits requires advance preparation. This is best done by an interdepartmental task force whose mission includes:

Evaluate the performance of the function under review, based on available information

Identify information which is needed but is unavailable

Recommend the principal topics which merit examination in depth by upper management.

Identify the questions which require resolution by upper management.

Such audits can serve multiple purposes. They provide:

A form of hands-on leadership by upper management

Training in the quality disciplines

Identification of major opportunities which have in the past received low priority.

### THE GOVERNMENT-INDUSTRY RELATIONSHIP

FIG.14 -off  
again

Now let me conclude by an observation on the government-industry relationship.

The background of this conference is properly one of a gathering crisis. The problem is real. The main response

must be a revolutionary change in the pace of annual improvement in quality. We can meet this year's budget without improvement in quality, but at the end of the year we will have fallen one year behind each competitor who did make improvements in quality. If this goes on year after year we are in deep trouble. We may get by for the short run but not for the long run - instead, there will be no long run.

FIG.16 -on

The revolution cannot take place without upper management leadership and a planned approach. This revolutionary change is required from government and industry alike. Each is part of the problem.

FIG.16 -off

In their role of spending public moneys the government managers are concerned with both of these revolutions:

Creating the needed revolution within the government

Assuring that the needed revolution is created within industry.

A great deal depends on just how that latter responsibility will be carried out. It is a complex problem, and I am aware that it is undergoing active study. In this connection let me note that we are underemploying the concept of contracts based on life cycle costing or based on payments geared to the amount of use of the product. These concepts are inherently sound and they offer a major opportunity for improvement in national productivity. At the same time I am fully aware that these concepts will move slowly. We lack much essential data and we face severe cultural resistance.

In any case I hope that the government will go at this on a constructive basis, keeping to a minimum any public castigation or criticism. We all know that members of a winning team are united. They fight with the opposition. Members of a losing team are divided. They fight with each other.

# **THREE BREAKS WITH TRADITION:**

**ANNUAL IMPROVEMENT**

**MASSIVE TRAINING**

**HANDS-ON LEADERSHIP**

FIGURE 1

**DEFECT Z****\$ MILLION**

<b>ORIGINAL COST</b>	<b>3</b>
<b>REVISED COST</b>	<b>1</b>
• <b>SAVED</b>	<b>2</b>
• <b>INVESTED</b>	<b>0.25</b>

FIGURE 2

**ABC COMPANY**

<b>SALES</b>	<b>1,000</b>
<b>PROFIT</b>	<b>100</b>
<b>INVESTMENT</b>	<b>500</b>
<b>COST OF POOR Q</b>	<b>200</b>
<b>POTENTIAL SAVING</b>	<b>100</b>
<b>NEEDED INVESTMENT</b>	<b>12.5</b>

FIGURE 3

# **THE KEY STEPS**

**A BELLWETHER PROJECT**

**USE OF THE LANGUAGE OF MANAGEMENT**

**THE PROJECT CONCEPT; AN END TO  
EXHORTATION**

**AN ORGANIZED APPROACH TO ANNUAL  
IMPROVEMENT**

**FIGURE 4**

## COMMON LANGUAGES IN THE COMPANY

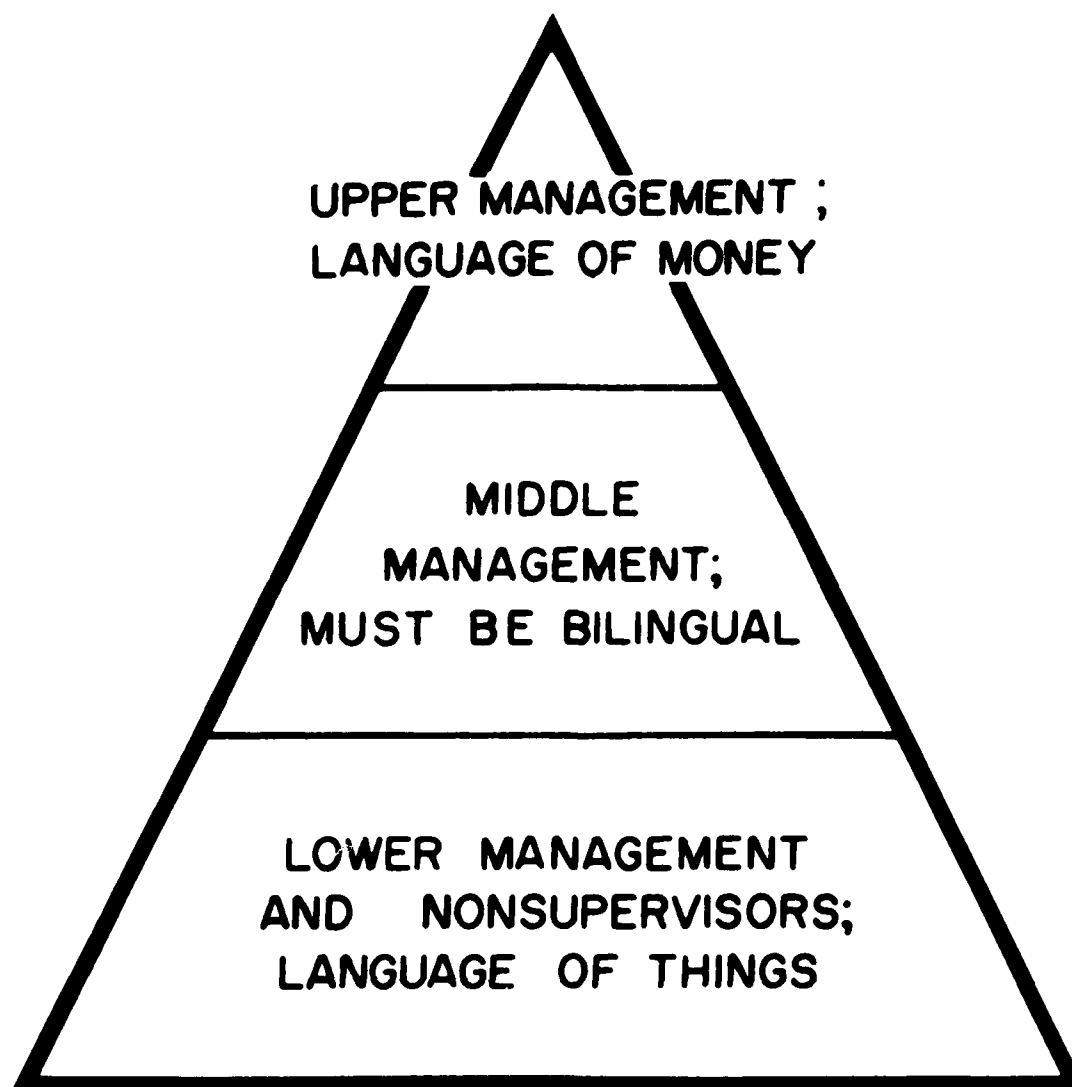


FIGURE 5

## **THE ANNUAL OPERATING PLAN**

**BROAD GOALS: SALES, GROWTH, ETC.**

**SPECIFIC DEEDS:**

- **SELL X UNITS**
- **MAKE Y UNITS**
- **PROVIDE PERSONNEL, FACILITIES**
- **DEVELOP NEW PRODUCTS**
- **UPGRADE CERTAIN FACILITIES**
- **MAKE ACQUISITIONS**
- **ETC.**

**TRANSLATE INTO MONEY**

**CUT, FIT, FINALIZE**

**PUBLISH AS FORMAL BUDGET**

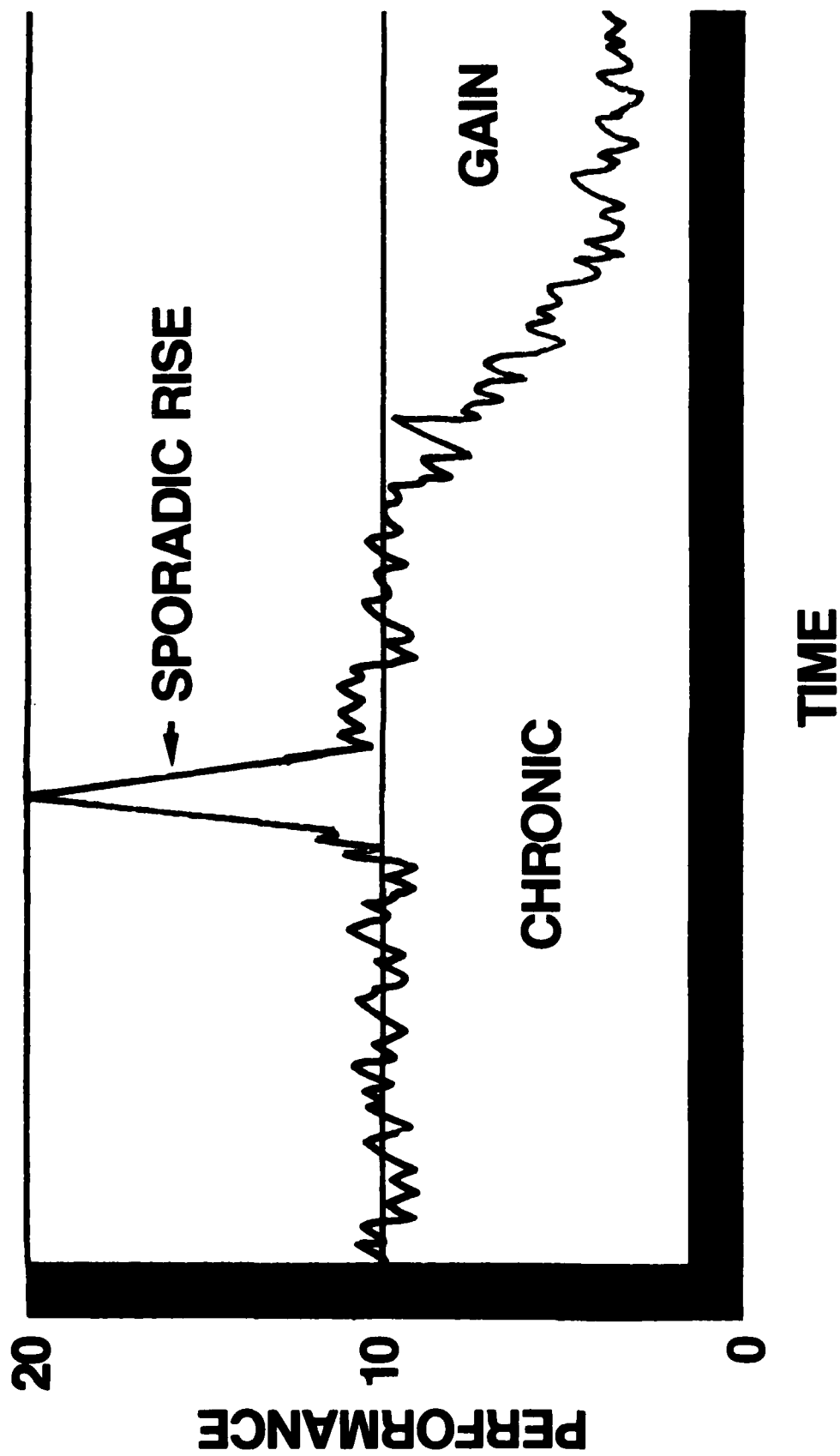
**ESTABLISH CLEAR RESPONSIBILITIES**

**ESTABLISH PROGRESS REPORTING**

**UPPER MANAGERS REVIEW PROGRESS**

FIGURE 6





## **ORGANIZATION FOR IMPROVEMENT**

**COUNCIL OR COMMITTEE**

**SUBCOMMITTEES AS NEEDED**

**SOLICIT NOMINATIONS**

**SCREEN; SELECT PROJECTS**

**CHARTER FOR PROJECT TEAMS**

**APPOINT PROJECT TEAMS**

**PROGRESS REPORTS**

**REVIEW BY UPPER MANAGEMENT**

# **UNIVERSAL SEQUENCE FOR BREAKTHROUGH**

**PROOF OF THE NEED**

**PROJECT IDENTIFICATION; THE PARETO  
PRINCIPLE**

**ORGANIZATION TO GUIDE THE PROJECTS**

**ORGANIZATION FOR DIAGNOSIS—FOR  
ANALYSIS OF PROJECTS**

**DIAGNOSIS—BREAKTHROUGH IN KNOWLEDGE**

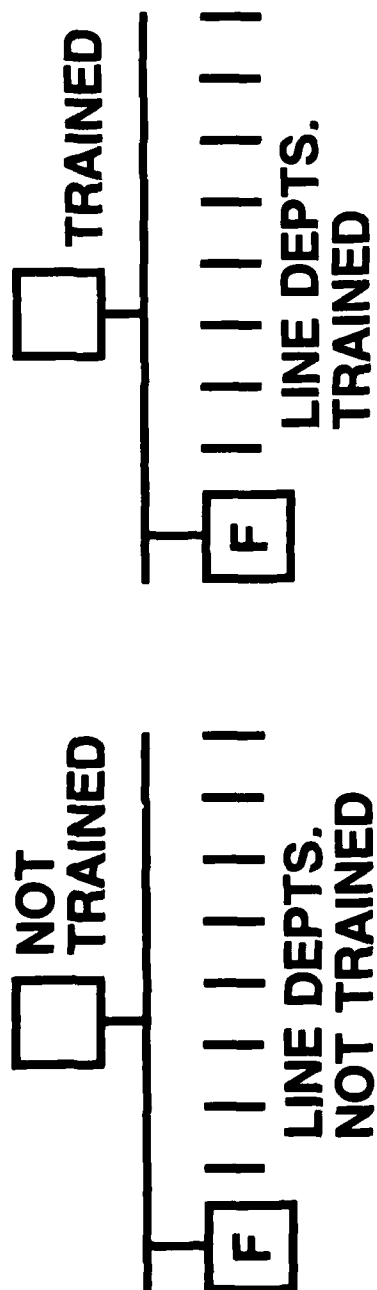
**BREAKTHROUGH IN RESULTS—REMEDIAL  
ACTION ON THE FINDINGS**

**BREAKTHROUGH IN CULTURAL RESISTANCE TO  
CHANGE**

**CONTROL AT THE NEW LEVEL**

FIGURE 9

# TRAINING IN FINANCE DISCIPLINES



A

B

FIGURE 10

## TRAINING IN QUALITY DISCIPLINES

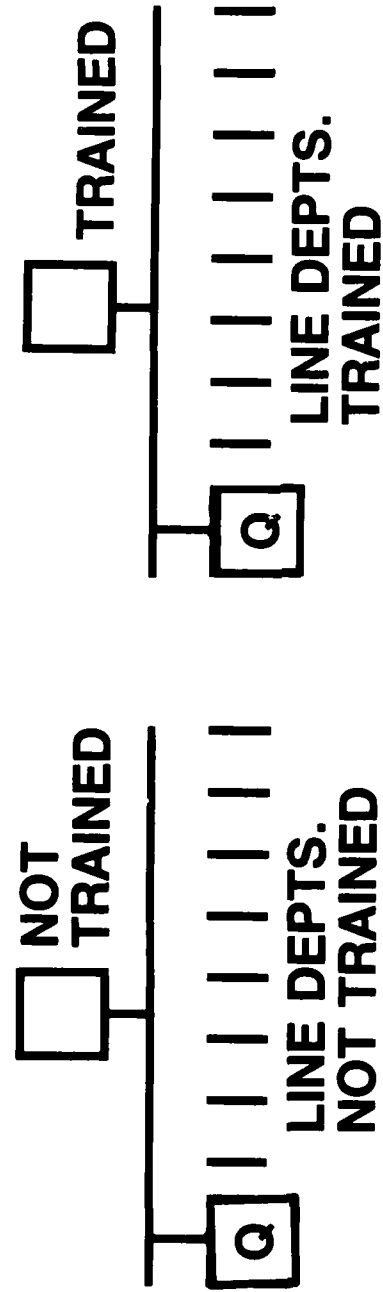


FIGURE 11

# **A PLANNED APPROACH TO TRAINING**

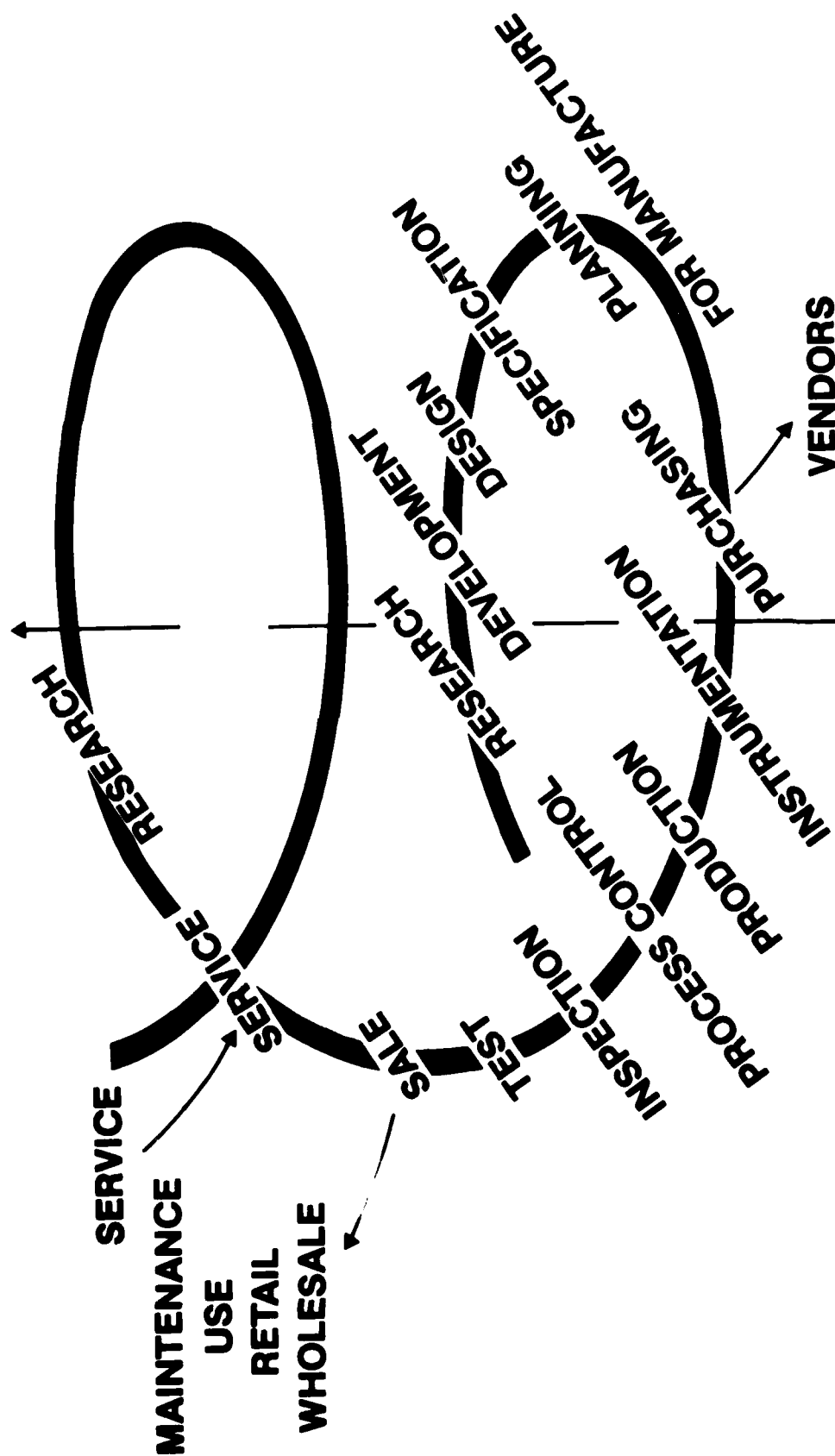
## **INTERDEPARTMENTAL TASK FORCE:**

- IDENTIFIES THE TRAINING NEEDS
- PROPOSES A PROGRAM, INCLUDING:
  - SOURCES OF TRAINING MATERIALS
  - SOURCES OF LEADERS
  - BUDGET
  - TIMETABLE

## **JUSE 1980 TRAINING COURSE FOR TOP MANAGEMENT**

<b>ROLE OF TOP MANAGEMENT</b>	<b>1.5</b>
<b>NEW PRODUCT DEVELOPMENT</b>	<b>2.0</b>
<b>STATISTICAL METHODS</b>	<b>3.5</b>
<b>QC MANAGEMENT</b>	<b>3.5</b>
<b>QC IN MANUFACTURE</b>	<b>3.5</b>
<b>QC IN PURCHASING AND SALES</b>	<b>3.5</b>
<b>QUALITY ASSURANCE</b>	<b>3.5</b>
<b>QC IN JAPAN AND IN THE WORLD</b>	<b>3.5</b>
<b>GROUP DISCUSSIONS</b>	<b>3.0</b>
<b>REPORTS ON GROUP DISCUSSIONS</b>	<b><u>3.0</u></b>
<b>TOTAL (HOURS)</b>	<b>30.5</b>

# THE SPIRAL OF PROGRESS IN QUALITY.





## **THE HISTORICAL REVIEW**

### **LIST OF PROBLEMS ENCOUNTERED**

- SYMPTOMS
- CAUSES
- REMEDIES
- COSTS

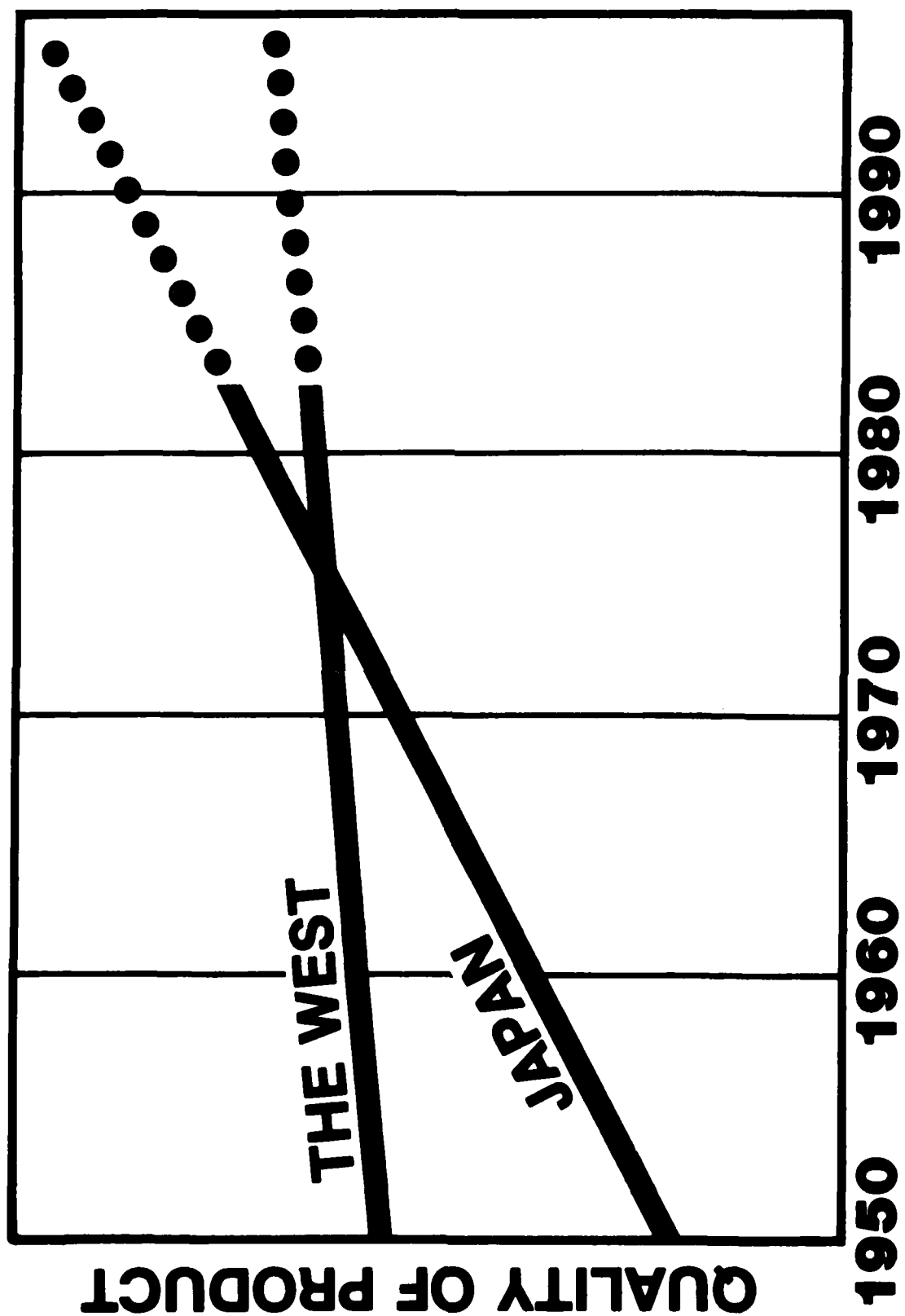
### **FOR EACH PROBLEM**

- AT WHAT STAGE WAS IT FOUND?
- AT WHAT STAGE COULD IT HAVE BEEN FOUND?

### **WHAT ARE THE NEEDED CHANGES IN THE SYSTEM?**

FIGURE 15

# WORLD COMPETITION IN QUALITY



BOTTOM LINE CONFERENCE

"There can be no product recalls on the battlefield. No time for warranty work."

HONORABLE FRANK C. CARLUCCI  
DEPUTY SECRETARY OF DEFENSE

REMARKS TO BE USED BY  
DEPUTY SECRETARY OF DEFENSE  
FRANK C. CARLUCCI  
BEFORE DLA BOTTOM LINE CONFERENCE  
13 MAY 1982

Today we do not have the military capability to achieve our national security objectives. But we do have a plan to get us there -- the keystone of that plan is the FY 83 defense program.

Whether we succeed in implementing that plan will depend on Congressional and public support. And whether that plan produces the capabilities it is intended to produce, depends to a large measure on your ability to instill high standards of quality and productivity in our defense industry.

Let me review for you the state of DoD as we found it.

1. Readiness and sustainability planes that don't fly, ships that don't sail. Ammo. Hollow Army.

2. Strategic. Vulnerable ICBM force, aging bomber fleet, inadequate C<sup>3</sup>.

3. Modernization. Slowed to a pace where stretch outs and buy ins were the practice just to preserve program.

Not the fault of those in DoD. They fought this. Was a result of budget priorities, pure and simple.

While Soviets investing, we disinvesting. DoD dropped from 50% to 25% of budget. Soviets spend 50% more than we.

How we approached situation.

1. Reformed process. PPBS

2. Drew up strategy to determine budget. Those who claim have none. Fact is don't like it, because still want to let budget drive strategy.

Set priorities within strategy.

1. Readiness

2. Strategic - D-5, B-1, C<sup>3</sup>  
15% - goal not superiority

3. Modernization

4. Force structure

Laid this before Congress in 5 year plan. Honest budget. Key to making it work is staying with this budget. Let me explain why.

Defense spending slowest spendout in government. 63% personnel and O&M. 29% TOA from prior years. 7% discretion procurement. Modernization is key to effective defense over long run.

Yet we have treated that 7% like a yo yo. Start and stop. Promise and retreat. Commit and then stretch out.

You as a businessman know the result. Wasteful procurement practices, hostility between DoD and drying up of industrial base.

We have made major effort to correct this, because we believe industrial base vital part of national security. Also need public support on the way we do business.

But remedy requires resolve, consistency and in some cases investment up front, qualities that have been lacking in prior years.

Let me cite a few examples of what doing.

1. Budgeting for inflation
2. Budgeting to most likely cost
3. Killing programs - 83 for savings of \$1.6B (FY 83)  
no big ones.
4. Evolutionary approach P<sup>3</sup>I
5. Multi year contracting
6. Full funding
7. Tighter contracts and tougher program management.

Also moving in area of audits and fraud, waste and abuse. Audit resolution. IG. Hot line calls.

You as a businessman know the importance of laying out goals, building a coherent and integrated program and sticking with it.

Until we can do this in government you will hear cries of waste and they will be true. Already those in Congress who would impose large reductions in defense are looking at stretch outs, cutting readiness and other false savings.

We are doing our part to demonstrate to Congress and the American public the folly of repeating past mistakes. Your voice of support would help.

79 On the other hand, you must take the lead in making a national commitment to quality; DoD will support you.

Too much evidence of cutting corners for short-term profits and poor workmanship. Shrinking and multi-colored uniforms. Soft metal parts and forgings on projectiles and aircraft. Defective semiconductors.

There can be no product recalls on the battlefield. No time for warranty work. The lives of American servicemen and women are on the line.

With \$200B defense outlays, 1% defective equipment rate costs taxpayer \$2B. And some companies think that 5% is acceptable.

Cannot blame poor quality on worker; management sets the standards to which he responds.

Quality produces profits, not costs for you. No reworking, fewer back-up spares, less foreign competition for markets.

Between 1960-1979 U.S. industry's share of U.S. market dropped sharply in several areas vital to U.S. defense: Steel 96% - 86%, electrical components 98% - 81%, metal cutting tools 97% - 75%.

DoD wants to buy American products, but must get best quality. Our policy is to award contracts only to contractors with good previous history of quality products and services.

DoD encourages defense industry to:

- Design in quality and reliability
- Use good facilities and techniques to preserve

design standards during manufacture.

- Establish tight quality control system.

The bottom line is national security. To preserve peace with freedom we must have national resolution to stay the course to rearm America and your commitment to keep the standards high.



BOTTOM LINE CONFERENCE

"The Navy cannot guarantee the fulfillment of its military role with the low quality of weapon systems and support services we have accepted in the past. We are embarked on a new acquisition and support policy which mandates reliability above all else."

ADMIRAL JOHN G. WILLIAMS, USN  
CHIEF OF NAVAL MATERIAL

THE THREE R'S

RELIABILITY, READINESS AND REALITY

NO ONE IN THIS AUDIENCE SHOULD BE A STRANGER TO WHAT THE NAVY HAS BEEN DOING SINCE ABOUT 1975 TO IMPROVE THE RELIABILITY OF THE NEW WEAPON SYSTEMS WE ARE DEPLOYING. TODAY I PLAN TO TELL YOU WHY WE INITIATED THIS BOLD NEW THRUST IN MATERIAL ACQUISITION, A LITTLE OF WHAT IT ENTAILS, AND THE IMPACT ! BELIEVE IT WILL HAVE ON OUR INDUSTRIAL BASE, OUR LOGISTICS SYSTEM, AND MOST IMPORTANT, FLEET READINESS.

THE NAVY IS UP AGAINST PERHAPS THE MOST SERIOUS CHALLENGE IN ITS HISTORY. IN THE FACE OF AN ESCALATING POLITICAL AND TECHNOLOGICAL THREAT TO OUR NATION'S SURVIVAL, WE ARE IN THE MIDST OF ONE OF OUR WORST ECONOMIC CRISES, A CRISIS WHICH PLACES DEFINITE LIMITS ON OUR ABILITY TO RESPOND TO THAT THREAT. AMERICAN INDUSTRY HOLDS THE KEY TO OUR MEETING THIS CHALLENGE. FOR TOO LONG, WE HAVE ASKED YOUR COOPERATION AND THEN IGNORED OUR OBLIGATION TO SUPPORT YOUR EFFORTS

CONTRACTUALLY, FINANCIALLY, AND PERSONALLY. AS A RESULT, WE "GOT WHAT WE PAID FOR," BUT IT IS NO LONGER ENOUGH. THE NAVY CANNOT GUARANTEE THE FULFILLMENT OF ITS MILITARY ROLE WITH THE LOW QUALITY OF WEAPON SYSTEMS AND SUPPORT SERVICES WE HAVE ACCEPTED IN THE PAST. WE ARE EMBARKED ON A NEW ACQUISITION AND SUPPORT POLICY WHICH MANDATES RELIABILITY ABOVE ALL ELSE -- PERFORMANCE WITHOUT FAILURE, AND WE ARE SEEING SOME RESPONSE TO OUR EFFORTS.

WHY IS RELIABILITY SO IMPORTANT WHEN WE HAVE A VERY EFFECTIVE LOGISTICS SUPPORT SYSTEM IN PLACE WHICH CAN DEAL WITH WEAPON SYSTEM FAILURES? IN THE FIRST PLACE, ALL THE PERFORMANCE IN THE WORLD DOES US NO GOOD IF THE PERFORMANCE STOPS IN THE MIDDLE OF THE BATTLE. IN FACT, FAILED EQUIPMENT BECOMES A "MILLSTONE AROUND OUR NECKS" UNDER THESE CONDITIONS. SO RELIABILITY IS ESSENTIAL TO MISSION SUCCESS.

SECONDLY, OPERATIONAL READINESS OR AVAILABILITY IS DETERMINED BY RELIABILITY AND DOWNTIME FOR REPAIR. LOW RELIABILITY IS A DOUBLE-EAGED SWORD WHICH NOT ONLY REDUCES READINESS DIRECTLY BUT ALSO PLACES A SEVERE DRAIN ON MAINTENANCE MANPOWER AND SPARE PARTS, REDUCING READINESS INDIRECTLY BY INCRESING THE DOWNTIME FOR REPAIR. ONE OF MY PREDECESSORS, ADM "IKE" KIDD USED TO REFER TO THE "UMBILICAL TO THE BEACH" IN FOCUSSING ON OUR DEPENDENCE ON LOGISTIC SUPPORT TO MAINTAIN READINESS. LOW RELIABILITY GIVES THE NAVY NO ALTERNATIVE, AND THIS UMBILICAL WILL MOST CERTAINLY BE SEVERELY CONSTRICTED, IF NOT CUT, IN BATTLE.

LAST BUT NOT LEAST, THE COST OF DEFENSE IS THE HOTTEST TOPIC IN TOWN TODAY. IT HAS BEEN PROVEN OVER AND OVER AGAIN THAT ADDITIONAL FRONT-END INVESTMENT IN RELIABILITY IS MORE THAN OFF-SET BY REDUCED SUPPORT COST OVER THE LIFE CYCLE. THE BEST WAY TO REDUCE THE COST OF DEFENSE SYSTEMS IS TO BUY THE

BEST THAT INDUSTRY CAN DELIVER -- THE HIGHEST POSSIBLE RELIABILITY. I WILL ADMIT TO THE POSSIBILITY OF A POINT OF DIMINISHING RETURNS. BUT IF ONE EXISTS, WE ARE MISSING IT BY SUCH A WIDE MARGIN THAT I AM NOT CONCERNED ABOUT "TOO MUCH RELIABILITY."

A SYSTEM IS DESIGNED ONLY ONCE, AND WHEN IT ISN'T RELIABLE, THE HUNDREDS OR THOUSANDS OF COPIES PLACED IN SERVICE REQUIRE SUPPORT RESOURCES OUT OF ALL PROPORTION TO THE ORIGINAL COST. I CAN'T QUANTIFY IT, BUT EVERY PERCENTAGE POINT THAT RELIABILITY GOES UP IS EQUIVALENT TO "X" ADDITIONAL WEAPONS IN OUR INVENTORY. I'M TALKING NOW ABOUT DOLLARS -- A SUBJECT EVERYONE UNDERSTANDS -- WITHOUT REGARD TO THE SCARCITY AND VALUE OF TECHNICIANS AND SPARE PARTS IN WARTIME. ADD THESE TO THE EQUATION, AND LOW RELIABILITY SHOULD BE UNTHINKABLE.

IT IS IMPROTANT FOR YOU TO UNDERSTAND AS I DO THAT RELIABILITY IS NOT A COST-DRIVER. FOR INDUSTRY, IT MEANS MORE PROFIT -- ELIMINATION OF THE "HIDDEN FACTORY" OF REWORK, WHICH CAN BE AS HIGH AS 40% OF THE MANUFACTURING COSTS AND AN ESTABLISHED REPUTATION WHICH LEADS TO FOLLOW-ON BUSINESS. FOR THE NAVY, IT MEANS MISSION SUCCESS, READINESS, AND REDUCED LIFE CYCLE COST. PROPERLY MANAGED, ACQUISITION OF RELIABLE SYSTEMS COSTS MORE IN BOTH TIME AND DOLLARS DURING THE DEVELOPMENT PHASE -- FRONT-END INVESTMENT. ONCE PRODUCTION STARTS, THE RECURRING COST TO DUPLICATE RELIABLE DESIGNS SHOULD BE LITTLE DIFFERENT FROM THE COST OF UNRELIABLE DESIGNS, IF MANUFACTURING DEFECTS ARE UNDER CONTROL. BUT MANUFACTURING DEFECTS ARE NOT UNDER CONTROL. THEY CAUSE MOST OF THE FAILURES IN THE FLEET TODAY. I SUSPECT THAT THEY ACCOUNT FOR A GOOD BIT OF THE ACQUISITION COST AS WELL.

IN THE EARLY 1970'S ONE OF MY PREDECESSORS, ADM KIDD, DECIDED TO TURN OUR SHIP AROUND. A NUMBER OF CRITICAL FACTORS WERE ERODING THE READINESS OF THE NAVY'S WEAPON SYSTEMS TO THE POINT THAT STRONG ACTION WAS MANDATORY. BESIDES LOW RELIABILITY, THERE WAS A SHORTAGE OF SPARE PARTS WHICH COULD BE ATTRIBUTED IN PART TO THE HIGH RATES OF FAILURE BEING EXPERIENCED, AND MAINTENANCE MANPOWER PROBLEMS, SUCH AS DECLINING COMPREHENSION LEVELS AND POOR PERSONNEL RETENTION, WERE RIFE. I'M USING THE PAST TENSE INTENTIONALLY BECAUSE I AM SEEING IN OUR SYSTEMS NOW BEING INTRODUCED IN THE FLEET SUBSTANTIAL DIFFERENCES FROM PAST EXPERIENCE. THE F/A-18 AIRCRAFT, FOR EXAMPLE, IS WINNING PRAISE FROM OUR AVIATORS AND TECHNICIANS AS THE MOST RELIABLE, EFFECTIVE AIRCRAFT OF ITS CLASS EVER DEPLOYED IN THE NAVY.

AS MOST OF YOU KNOW, THE NAVY'S APPROACH TO TURNING OUR RELIABILITY PROBLEMS AROUND WAS TO UNDERSTAND AND MANAGE THE DESIGN AND MANUFACTURING FUNDAMENTALS THAT RESULT IN RELIABLE HARDWARE. THIS IS THE SAME APPROACH USED IN THE COMPETITIVE COMMERCIAL MARKETPLACE, AND SUCCESSFULLY DEMONSTRATED IN THE AEROSPACE COMMUNITY AS WELL. BUT GOVERNMENT CONTRACTS INHERENTLY CONTAIN NO COMPETITIVE INCENTIVE. ONCE THE CONTRACTS ARE LET, THE COMPETITION IS OVER. SO THE DESIGN AND MANUFACTURING FUNDAMENTALS TO PRODUCE RELIABLE HARDWARE MUST BE EXPLICITLY SPELLED OUT IN THE CONTRACTS AND WATCHED BY THE PROGRAM MANAGERS TO INSURE THAT THEY ARE FULLY EXPLOITED.

INDUSTRY DEVELOPED AND IS WELL AWARE OF THESE FUNDAMENTALS THROUGH THEIR OWN EXPERIENCE, BUT THE NAVY HAS HAD A DIFFICULT TIME LEARNING THEM AND THEN CHANGING OUR WAY OF DOING BUSINESS. THE FACT IS THAT WE HAVE CALLED ON INDUSTRY FOR HELP IN THIS ENDEAVOR ON NUMEROUS OCCASIONS, SEVERAL OF WHICH I WILL



ACKNOWLEDGE TODAY. RELIABILITY BY DESIGN AND MANUFACTURING IS NOT TAUGHT AS A UNIFIED BODY OF KNOWLEDGE OR EVEN AS A SINGLE COURSE IN ANY UNIVERSITY OF WHICH I AM AWARE. IT SEEMS THAT THE ACADEMIC WORLD WANTS TO PERPETUATE THE PURSUIT OF RELIABILITY AS A FRUITLESS EXERCISE IN ADVANCED STATISTICS. SO WE ARE ON OUR OWN, AND WE HAVE DEMONSTRATED SUCCESS. IN FACT, THE DEPARTMENT OF DEFENSE HAS NOW INCORPORATED OUR APPROACH IN THE DEPARTMENT-WIDE R&M DIRECTIVE 5000.

I SAID INDUSTRY HAS HELPED US DO THIS. LET ME GIVE YOU AN EXAMPLE. FOR MANY YEARS, IT HAS BEEN STANDARD GOVERNMENT PRACTICE TO REQUIRE ENVIRONMENTAL ACCEPTANCE TESTING OF EACH CONTRACT END ITEM PRODUCED. BUT THE REQUIRED TEST ENVIRONMENT HAS BEEN A VERY BENIGN ONE, AND HARDWARE WAS SHIPPED WHICH CONTAINED LATENT MANUFACTURING DEFECTS WAITING TO SHOW UP IN THE FLEET. AND THEY ARE SHOWING UP, AS YOU WELL KNOW. IN 1979, THE NAVAL MATERIAL COMMAND PUBLISHED A GUIDELINE DOCUMENT ON THE USE OF RANDOM VIBRATION AND THERMAL CYCLING TO STIMULATE

LATENT DEFECTS FOR CORRECTION BEFORE HARDWARE LEFT THE FACTORY. THIS DOCUMENT WAS LIMITED IN SCOPE, AND WE CHALLENGED THE INSTITUTE OF ENVIRONMENTAL SCIENCES TO GRAB THIS BALL AND RUN WITH IT. AFTER TWO YEARS OF CONFERENCES AND HARD WORK, THE IES HAS PUBLISHED A FIRST EDITION OF A HANDBOOK ON WHAT THEY ARE CALLING ENVIRONMENTAL STRESS SCPEENING. I COMMEND IT TO YOUR ATTENTION, AND I APPLAUD THE IBS FOR IT'S DILIGENT EFFORTS.

ANOTHER GOOD EXAMPLE IS ELECTRONIC POWER SUPPLIES, WHICH ARE THE CAUSE OF A MAJORITY OF THE ELECTRONIC SYSTEM FAILURES IN SERVICE. FOR A NUMBER OF REASONS, OUR DESIGN AND MANUFACTURING INITIATIVES HAVE NOT BEEN ADEQUATELY APPLIED TO POWER SUPPLIES. SO WE ASKED THE POWER SUPPLY INDUSTRY TO TELL US WHY AND TO RECOMMEND CORRECTIVE ACTION. AN AD HOC COMMITTEE OF INDUSTRY AND NAVY EXECUTIVES HAS BEEN MEETING PERIODICALLY SINCE LAST JUNE ON THIS MATTER, AND A GUIDELINE DOCUMENT FOR RELIABLE POWER SUPPLIES WILL BE PUBLISHED IN A FEW WEEKS. IN

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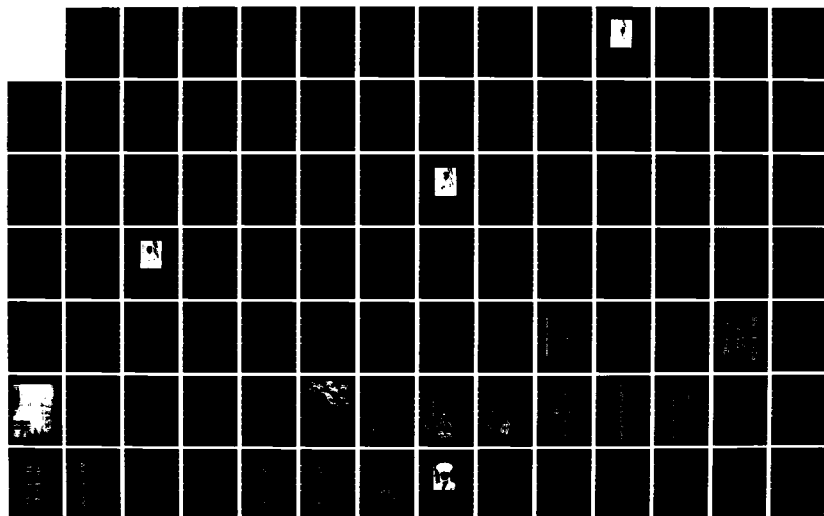
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SECRETARY OF DEFENSE WASHINGTON DC 1982

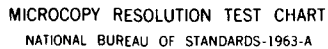
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THE MEANTIME, WE HAVE ISSUED A DIRECTIVE BASED ON THE COMMITTEE'S KEY FINDINGS WHICH I EXPECT WILL HAVE AN IMMEDIATE EFFECT IN FOCUSING ATTENTION ON POWER SUPPLY RELIABILITY.

WE HAVE ALSO HAD TO STEP ON A FEW TOES IN DOING WHAT WAS BEST FOR THE NAVY AND THE TAXPAYERS. TRANSISTORS, INTEGRATED CIRCUITS, AND OTHER SEMICONDUCTORS ARE MAJOR SOURCES OF NAVY ELECTRONIC SYSTEM FAILURES. FOR REASONS WE SIMPLY DON'T HAVE TIME TO INVESTIGATE, THE SEMICONDUCTOR INDUSTRY HAS BEEN SELLING A SUBSTANTIAL PERCENTAGE OF DEFECTIVE PARTS TO ELECTRONIC SYSTEMS MANUFACTURERS. WE HAVE RECOMMENDED TO OUR CONTRACTORS THAT THEY RE-SCREEN EVERY SEMICONDUCTOR THEY BUY, BECAUSE ITS CHEAPER TO FIND THE DEFECTIVE ONES BEFORE THEY ARE INSTALLED IN LARGE SYSTEMS. THE SEMICONDUCTOR INDUSTRY UNDERSTANDABLY HAS RESENTED THIS, BUT WE HOPE IT WILL SPUR THEM TO GET THEIR HOUSES IN ORDER.

LATENT DEFECTS FOR CORRECTION BEFORE HARDWARE LEFT THE FACTORY. THIS DOCUMENT WAS LIMITED IN SCOPE, AND WE CHALLENGED THE INSTITUTE OF ENVIRONMENTAL SCIENCES TO GRAB THIS BALL AND RUN WITH IT. AFTER TWO YEARS OF CONFERENCES AND HARD WORK, THE IES HAS PUBLISHED A FIRST EDITION OF A HANDBOOK ON WHAT THEY ARE CALLING ENVIRONMENTAL STRESS SCREENING. I COMMEND IT TO YOUR ATTENTION, AND I APPLAUD THE IBS FOR IT'S DILIGENT EFFORTS.

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FIRST: MULTI-YEAR PROCUREMENT. NINE NAVY PROGRAM CANDIDATES HAVE BEEN APPROVED BY THE SECRETARY OF DEFENSE FOR FISCAL YEARS 82 AND 83. NEW MULTIYEAR PROCEDURES HAVE BEEN PROMULGATED THROUGHOUT THE GOVERNMENT AND INDUSTRY. SOME REGULATIONS AND DIRECTIVES HAVE BEEN DISTRIBUTED AND OTHERS ARE IN THE PROCESS OF REVISION AND PUBLICATION.

SECOND: PROGRAM STABILITY. WE HAVE TERMINATED OR RESTRUCTURED A NUMBER OF PROGRAMS IN ORDER TO FULLY FUND OUR HIGHER PRIORITY PROGRAMS, A PROCESS WE PLAN TO CONTINUE IN THE FUTURE.

THIRD: PREPLANNED PRODUCT IMPROVEMENT. WE MUST EXAMINE EVOLUTIONARY ALTERNATIVES WHICH USE A LOWER RISK APPROACH TO TECHNOLOGY THAN SOLUTIONS AT THE FRONTIER OF TECHNOLOGY. OUR SYSTEMS COMMANDS HAVE SELECTED 45 PROGRAMS WHICH ARE CANDIDATES FOR P<sup>3</sup>I.

FOURTH: ENCOURAGING CAPITAL INVESTMENT TO IMPROVE PRODUCTIVITY.

CONSEQUENTLY, ADEQUATE FUNDING REMAINS OUR BIGGEST HURDLE. WE HAVE MANAGED TO DO WHAT HAD TO BE DONE IN MANY CASES BY REPROGRAMMING EXISTING FUNDS. FOR THE LONG TERM, HOWEVER, WE ARE WORKING TO INSURE BUDGETED FRONT-END FUNDING ADEQUATE TO DO OUR JOB.

A. SECOND HURDLE WE HAVE YET TO JUMP IS ADEQUATE DOCUMENTATION AND TRAINING OF OUR PEOPLE AND YOURS TO PROVIDE FOR AND INSURE FULL IMPLEMENTATION OF THE DESIGN AND MANUFACTURING APPROACH TO RELIABILITY. IN THE MID-70's VIRTUALLY NO EXISTING SPECIFICATIONS, STANDARDS, HANDBOOKS, OR TRAINING PROGRAMS COULD BE ADAPTED TO OUR PURPOSES. IMPLEMENTATION HAS TO THIS DATE BEEN LARGELY VERBAL, ALTHOUGH WE NOW HAVE SEVERAL NAVY STANDARDS DEALING WITH SELECTED ASPECTS OF THE APPROACH. WITH THE ASSISTANCE OF DOD AND OUR FELLOW SERVICES, AND WITH THE COOPERATION AND SUPPORT OF OUR CONTRACTORS, I EXPECT THE NECESSARY DOCUMENTATION AND TRAINING PROGRAMS TO MATERIALIZE IN THE NEAR FUTURE. IN THE MEANTIME,



AND I WOULD HOPE INDEFINITELY, THE NAVY WILL RELY ON THE UNDERSTANDING, COOPERATION, AND SUPPORT OF OUR CONTRACTORS TO IMPLEMENT CERTAIN FUNDAMENTALS WHICH MAY NOT BE SPECIFICALLY CALLED OUT IN THE WORK STATEMENTS.

HOW RELIABLE MAY WE REASONABLY EXPECT TO MAKE NEW WEAPON SYSTEMS? IN THE PAST, WE HAVE REVIEWED THE TRACK RECORDS OF SIMILAR SYSTEMS ALREADY IN THE FLEET, MADE AN ALLOWANCE FOR THE LEARNING CURVE, AND AIMED AT DOUBLING THE RELIABILITY OF NEW SYSTEMS. BUT OUR APPROACH IS CAPABLE OF FAR BETTER THAN THAT. FROM WHAT I HAVE SEEN HAPPENING AMONG OUR CONTRACTORS RECENTLY, AND WITH GROWING EXECUTIVE-BRANCH SUPPORT OF OUR RELIABILITY AND READINESS INITIATIVES, I AM CONVINCED THAT INDUSTRY CAN DELIVER JUST ABOUT ANY LEVEL OF RELIABILITY NEEDED IF GIVEN THE OPPORTUNITY TO START RIGHT AT THE BEGINNING OF THE ACQUISITION CYCLE. ACCORDINGLY, I HAVE ASKED OUR TECHNOLOGY BASE COMMUNITY TO INVESTIGATE REALISTIC RELIABILITY REQUIREMENTS BASED ON THE LIMITS OF TECHNOLOGY. I AM ESPECIALLY CONCERNED THAT PLANS AND

REQUIREMENTS BE BASED ON THE WORST POSSIBLE OPERATIONS -- FIGHTING, NOT TRAINING -- AND THAT HARDWARE BE BOTH MAINTAINABLE BY AND INVULNERABLE TO NAVY PERSONNEL, "SAILOR-PROOF" IF YOU WILL.

INDUSTRY HAS BEEN VERY RECEPTIVE TO THE NAVY'S DESIGN AND MANUFACTURING APPROACH, AND THERE ARE NUMEROUS EXAMPLES OF INDEPENDENT CAPITAL INVESTMENT IN NAVY PROGRAMS TO IMPLEMENT NEEDED ELEMENTS OF THIS APPROACH. PRODUCTION LINE MODERNIZATION, SEMI CONDUCTOR ENVIRONMENTAL SCREENING EQUIPMENT, AND RANDOM VIBRATION TEST EQUIPMENT ARE AMONG THE CHANGES IN CONTRACTOR FACILITIES. IT IS ENCOURAGING THAT CONTRACTORS ARE REALLOCATING FUNDS FOR APPROPRIATE AND ADEQUATE RELIABILITY DESIGN AND MANUFACTURING EFFORTS IN SPITE OF SOMETIMES LESS-THAN-OPTIMALLY-STATED CONTRACT REQUIREMENTS. I BELIEVE THAT INDUSTRY HAS A DUTY TO CHALLENGE DEFECTIVE REQUIREMENTS, I.E., REQUIREMENTS WHICH DO NOT REFLECT THE DESIGN AND MANUFACTURING APPROACH, IN NAVY SOLICITATIONS.

I WILL CLOSE ON THIS NOTE: IT IS TIME TO FACE REALITY. IT IS HIGH TIME THAT INDUSTRY STOPPED VIEWING THE NAVY ONLY AS A CUSTOMER AND BEGAN THINKING IN TERMS OF A PARTNERSHIP IN THE DEFENSE OF OUR NATION. WE NO LONGER HAVE THE LUXURY OF TIME TO DO THINGS OVER. WE NO LONGER HAVE THE DOLLARS TO UPGRADE OR REPLACE OUR INVENTORY ON THE BASIS OF POOR RELIABILITY ALONE. WEAROUT AND TECHNOLOGICAL OBSOLESCENCE ARE JUSTIFIABLE REASONS FOR REPLACEMENT -- HIGH FAILURE RATES ARE NOT. NEVERTHELESS, WE ARE STILL REPLACING EQUIPMENT BECAUSE WE CAN'T SUPPORT IT IN AN ADEQUATE STATE OF READINESS. WE ENCOUNTER INSTANCES OF INADEQUATE OFF-THE-SHELF RELIABILITY BECAUSE WE DON'T BUY A LARGE ENOUGH FRACTION OF THE MANUFACTURER'S OUTPUT TO WARRANT SPECIAL TREATMENT. THESE INSTANCES RANGE FROM SEMICONDUCTORS TO PUMPS AND GENERATORS TO MAINFRAM COMPUTERS.

LADIES AND GENTLEMEN, THE THEME OF THIS MEETING IS  
"QUALITY: THE BOTTOM LINE." I WOULD PROPOSE THAT WE INCLUDE  
IN THIS THEME THE QUALITY OF LIFE WE ENJOY TODAY IN OUR FREE  
NATION. THE DECISION-MAKERS WHO HOLD THE POWER TO INSURE THIS  
QUALITY OF LIFE AND CONTINUED FREEDOM TO FUTURE GENERATIONS OF  
AMERICANS ARE IN THIS ROOM TODAY. WHAT DECISIONS WILL YOU TAKE  
HOME FROM THIS MEETING? WILL YOU TAKE IT SERIOUSLY?

BOTTOM LINE CONFERENCE



"Simply stated, improved productivity and improved profitability are inevitable by-products of improved quality."

MR. THOMAS J. MURRIN  
PRESIDENT, WESTINGHOUSE PUBLIC SYSTEMS

REMARKS TO  
DEFENSE LOGISTICS AGENCY BOTTOM LINE CONFERENCE  
"PRODUCTIVITY AND QUALITY IMPROVEMENT"

MAY 13, 1982

By

T. J. MURRIN

PRESIDENT, PUBLIC SYSTEMS

WESTINGHOUSE ELECTRIC CORPORATION

THANK YOU, \_\_\_\_\_, GOOD AFTERNOON.

I AM PLEASED TO BE A PART OF THIS DISTINGUISHED  
PANEL --- AND I JUDGE IT A PRIVILEGE TO BE ABLE  
TO TALK TO THIS IMPORTANT AUDIENCE ABOUT SUCH A  
CRUCIALLY IMPORTANT SUBJECT. I AM VERY HOPEFUL  
THAT SUCH CONFERENCES WILL HELP SPUR SUBSTANTIAL  
PRODUCTIVITY AND QUALITY IMPROVEMENTS.

THOUGH I'M HERE AS YOUR INDUSTRY SPOKESPERSON,  
MANY OF MY COMMENTS CONCERN MY COMPANY ---  
BECAUSE, OBVIOUSLY, THAT IS WHAT I'M MOST  
FAMILIAR WITH. BUT LET ME OBSERVE AT THE OUTSET  
THAT OUR AMERICAN AEROSPACE AND DEFENSE INDUSTRY  
HAS OUTSTANDING PRODUCTIVITY AND QUALITY  
CAPABILITIES AND COMMITMENTS --- AND, LATER, I'LL  
COME BACK TO EXPAND ON THIS.

AT WESTINGHOUSE, WE ARE PUTTING TOP PRIORITY  
EMPHASIS ON PRODUCTIVITY AND QUALITY IMPROVEMENT  
--- NOT ONLY BECAUSE IT IS NECESSARY FOR THE  
WELL-BEING OF OUR CORPORATION, BUT BECAUSE WE  
BELIEVE IT IS VITAL FOR THE ECONOMIC SURVIVAL OF  
OUR NATION --- AND FOR OUR NATIONAL SECURITY.

ABOUT 3-1/2 YEARS AGO, WE STARTED THIS  
CORPORATE-WIDE TOP-PRIORITY EMPHASIS ON  
PRODUCTIVITY IMPROVEMENT --- FOR TWO BASIC  
REASONS. FIRST WAS OUR NEED TO FURTHER IMPROVE  
OUR CORPORATE PERFORMANCE --- AND THE SECOND WAS  
OUR CONCERN OVER INCREASING INTERNATIONAL  
COMPETITION. WE DIDN'T WANT THIS TO BE A  
ONE-SHOT EFFORT --- BUT RATHER WE WANTED  
PRODUCTIVITY IMPROVEMENT TO BECOME A WAY-OF-LIFE  
THROUGHOUT THE CORPORATION.

IN EARLY 1979, WE FORMED A CORPORATE COMMITTEE ON PRODUCTIVITY --- AND I WAS ASSIGNED TO CHAIR IT. INITIALLY, OUR COMMITTEE SPENT MANY MONTHS STUDYING THE SITUATION --- FIRST IN THE UNITED STATES; THEN IN EUROPE; AND THEN IN THE PACIFIC BASIN --- PARTICULARLY IN JAPAN. SIGNIFICANTLY, WE DIDN'T ANTICIPATE, AT THE OUTSET, THAT MOST OF OUR STUDIES WOULD FIND THE JAPANESE TO BE SO FORMIDABLE. IN MY CASE, I'VE BEEN VISITING JAPAN FOR ALMOST 20 YEARS. BUT --- FOR THE FIRST 17 YEARS, AS A TEACHER --- AND ONLY FOR THE PAST 3 YEARS, AS A STUDENT. THIS "ROLE CHANGE" MAKES AN IMMENSE DIFFERENCE.

SIGNIFICANTLY ALSO, WE DIDN'T REALIZE, AT THE OUTSET, THAT QUALITY IS AS IMPORTANT TO PRODUCTIVITY --- AS ARE PEOPLE AND TECHNOLOGY.

DURING THE PAST TWO YEARS, WE HAVE HAD SEVERAL HUNDRED OF OUR MANAGEMENT AND PROFESSIONAL PEOPLE --- PLUS ABOUT FIFTY OF OUR UNION OFFICERS --- MAKE STUDY TRIPS TO JAPAN. SOME OF THESE TRIPS WERE FOR GENERAL INFORMATION --- BUT MANY HAVE BEEN SPECIFIC AND IN-DEPTH; ON SUCH SUBJECTS AS QUALITY MANAGEMENT; QUALITY CIRCLES; TRAINING; VALUE ANALYSIS; UNIONS; MICROELECTRONICS; COMPUTERS; INVENTORY MANAGEMENT; MACHINE TOOLS; AND ROBOTS.



GENERALLY, OUR PEOPLE CAME BACK FROM THESE TRIPS  
IN AWE OF JAPANESE MANUFACTURING TECHNOLOGY ---  
AND PARTICULARLY, THEIR DEVOTION TO QUALITY.

THESE STUDY TRIPS HELPED TO CONVINCE OUR TOP  
MANAGEMENT OF THE CRUCIAL IMPORTANCE OF  
PRODUCTIVITY AND QUALITY IMPROVEMENT.

CONSEQUENTLY, WE APPOINTED A FULL-TIME  
VICE-PRESIDENT OF CORPORATE PRODUCTIVITY AND  
QUALITY.

THEN WE CREATED OUR PRODUCTIVITY AND QUALITY  
CENTER --- AND WE HAVE ABOUT 300 FULL-TIME  
EMPLOYEES ASSIGNED TO THE CENTER.

WE CREATED A PRODUCTIVITY-SEED FUND, AND  
SUBSEQUENTLY A QUALITY-SEED FUND. THE FUND WAS  
ORIGINALLY ESTABLISHED TO HELP EXPEDITE  
PRODUCTIVITY AND QUALITY IMPROVEMENT PROGRAMS.  
TODAY, THE PRINCIPAL PURPOSE OF THESE FUNDS ---  
WHICH NOW TOTAL ABOUT 50 MILLION DOLLARS --- IS  
TO PROVIDE MONIES FOR HIGH-RISK, HIGH-PROMISE  
INITIATIVES.

THROUGH THESE FUNDS, WE HAVE INITIATED ABOUT 250 PROJECTS --- RANGING FROM THE TRAINING OF QUALITY CIRCLE FACILITATORS . . . TO THE APPLICATION OF HIGH-ENERGY LASERS TO MANUFACTURING.

THROUGHOUT THIS PROGRAM, OUR DEFENSE GROUP HAS PIONEERED PROMISING PEOPLE, TECHNOLOGY AND QUALITY INITIATIVES --- AND HAS MADE MUCH PROGRESS.

WE ESTABLISHED AN OVERALL CORPORATE GOAL FOR PRODUCTIVITY IMPROVEMENT --- BASED UPON ANNUAL INCREASES IN CONSTANT-DOLLAR, VALUE-ADDED PER EMPLOYEE --- AT SIX-PLUS PERCENT PER YEAR. OUR PUBLIC SYSTEMS COMPANY --- INCLUDING OUR DEFENSE GROUP --- HAS ACHIEVED A SEVEN-PLUS PERCENT ANNUAL PRODUCTIVITY INCREASE OVER THE PAST THREE YEARS --- AND WE'RE NOW STRIVING TO GET TO 10 PERCENT PER YEAR. A SEVEN PERCENT IMPROVEMENT RATE WOULD DOUBLE OUR OUTPUT EVERY 10 YEARS --- AND A 10 PERCENT RATE WOULD DO THIS IN ABOUT SEVEN YEARS! OBVIOUSLY, THE IMPLICATIONS TO THE QUALITY AND COST OF DEFENSE SYSTEMS ARE ENORMOUS --- IF THIS COULD BECOME A SUCCESSFUL INDUSTRY-WIDE PROGRAM.

AS I'VE NOTED, OUR PROGRAMS ARE CONCENTRATED ON PEOPLE, TECHNOLOGY AND QUALITY --- SO LET ME COMMENT BRIEFLY ON EACH . . .

WE BELIEVE THAT OUR GREATEST RESOURCE IS OUR PEOPLE. TREAT THEM WITH RESPECT; CHALLENGE THEIR INTELLIGENCE; APPEAL TO THEIR INNATE SENSE OF QUALITY --- IN SHORT, ENCOURAGE THEIR FULL PARTICIPATION IN OUR BUSINESS --- AND PRODUCTIVITY AND QUALITY IMPROVEMENT WILL LIKELY RESULT. INDUSTRIAL PSYCHOLOGISTS CALL IT PARTICIPATIVE MANAGEMENT. WE'VE COME TO REALIZE IT'S JUST PLAIN OLD COMMON SENSE --- AND GOOD BUSINESS SENSE.

ONE POWERFUL WAY WE HAVE BEEN ABLE TO INVOLVE OUR PEOPLE MORE EFFECTIVELY IS THROUGH QUALITY CIRCLES. TODAY WE HAVE ABOUT 1,300 QUALITY CIRCLES AT WESTINGHOUSE --- AT OVER 200 LOCATIONS. QUALITY CIRCLES WERE FIRST STARTED IN WESTINGHOUSE AT OUR BALTIMORE DEFENSE CENTER --- AND IT'S TYPICAL OF THEIR PIONEERING EFFORTS.

THOUGH WE DISCOVERED THE QUALITY CIRCLE CONCEPT IN JAPAN, WE THINK WE HAVE EXTENDED THE CONCEPT --- BY APPLYING IT TO WHITE-COLLAR, AS WELL AS BLUE-COLLAR EMPLOYEES. IN ALL, OVER 13,000 OF OUR WESTINGHOUSE EMPLOYEES ARE PRESENTLY INVOLVED IN QUALITY CIRCLES --- AND THIS NUMBER INCREASES BY SEVERAL HUNDRED EACH MONTH.

A SIGNIFICANT ASPECT OF QUALITY CIRCLES IS THAT THE PAYBACK IS EARLY --- NOT ONLY IN TERMS OF NEW IDEAS; BUT ALSO IN TERMS OF IMPROVED MORALE. THIS ADDS A NEW DIMENSION TO THE EMPLOYEE'S WORKLIFE --- CHALLENGING HIM TO COMMIT HIS MIND TO HIS JOB; AS WELL AS HIS HANDS.

IN EFFECT, QUALITY CIRCLES HAVE GREATLY MULTIPLIED THE INTELLECTUAL RESOURCES AVAILABLE WITHIN THE CORPORATION.

OUR SECOND INITIATIVE IS THE INTRODUCTION OF IMPROVED TECHNOLOGY TO LET US DO THE JOB RIGHT --- WITH THE RIGHT TOOLS. ACCORDINGLY, A SIGNIFICANT PORTION OF OUR PROGRAM IS DEVOTED TO INTRODUCING THE BEST AVAILABLE TECHNOLOGY TO HELP BOTH WHITE- AND BLUE-COLLAR WORKERS PERFORM THEIR JOBS MORE EFFICIENTLY. SUCH AS ELECTRONIC MAIL IN OUR OFFICES --- AND ROBOTS IN OUR FACTORIES.

MUCH OF OUR EFFORTS TO APPLY NEW TECHNOLOGY ARE AIMED AT MAKING OUR WHITE COLLAR WORKERS MORE PRODUCTIVE. THROUGHOUT WESTINGHOUSE, MORE THAN HALF OF OUR EMPLOYEES ARE NOW WHITE COLLAR --- AND IN OUR DEFENSE GROUP, THEY'RE OVER 70 PERCENT. THE AVAILABILITY OF A MYRIAD OF NEW, POWERFUL HARDWARE AND SOFTWARE SYSTEMS --- INCLUDING NOT ONLY CAD, CAM, CAT AND INTERACTIVE GRAPHICS; BUT ALSO ELECTRONIC MAIL, VOICE SWITCHING, WORD PROCESSING, HIGH-SPEED FACSIMILE TRANSMISSION AND PRINTING, AND AUDIO AND TELECONFERENCING --- MAKE THIS AN EXCITING AND PROMISING AREA.

FOR EXAMPLE, LAST WEEK, I --- AND MY SENIOR PITTSBURGH-BASED STAFF --- HAD A SUCCESSFUL TWO-DAY REVIEW MEETING WITH OUR TOP-MANAGEMENT DEFENSE CENTER TEAM; BASED IN BALTIMORE VIA OUR NEW TELECONFERENCING NETWORK. WHEN I TELL YOU THAT OUR 1981 CORPORATE TRAVEL BILL WAS ABOUT \$125 MILLION FOR TRANSPORTATION, HOTELS AND FOOD --- AND THAT WE ESTIMATE WE CAN REDUCE THIS COST BY AT LEAST 25% BY TELECONFERENCING --- YOU CAN BEGIN TO SEE THE POTENTIAL OF SUCH NEW TECHNOLOGY.

THIRDLY --- BUT MOST IMPORTANTLY --- WE ARE PUTTING MAJOR EMPHASIS ON QUALITY IMPROVEMENT BY CONCURRENTLY DESIGNING BOTH THE PRODUCT AND THE MANUFACTURING PROCESS. WE ARE EMPHASIZING QUALITY IN ALL ASPECTS OF OUR BUSINESS --- FROM SALES AND MARKETING TO SHIPPING AND SERVICE.

WE HAVE COME TO THE CONCLUSION THAT ONE OF THE KEY REASONS FOR PRODUCTIVITY PROBLEMS IN THE U.S. IS THE QUALITY OF OUR INDUSTRIAL OUTPUT. PRODUCING MORE --- AT THE EXPENSE OF QUALITY --- IS NO WAY TO INCREASE PRODUCTIVITY. DOING SOMETHING OVER BECAUSE IT WASN'T DONE RIGHT THE FIRST TIME DECREASES EFFICIENCY, WASTES MONEY AND LOWERS PRODUCTIVITY.

QUALITY AND PRODUCTIVITY GO HAND-IN-HAND. SIMPLY STATED, IMPROVED PRODUCTIVITY AND IMPROVED PROFITABILITY ARE INEVITABLE BY-PRODUCTS OF IMPROVED QUALITY.

WE HAVE INSTITUTED MANY YIELD ENHANCEMENT PROGRAMS AT OUR DEFENSE CENTER TO GET ALL OF OUR PEOPLE TO "DO IT RIGHT THE FIRST TIME" . . .

A PARTICULARLY SUCCESSFUL ONE IS OUR PRINTED WIRING ASSEMBLY PROGRAM. ABOUT 18 MONTHS AGO, OUR PEOPLE MADE A COMMITMENT TO DECREASE THE AMOUNT OF REWORK REQUIRED ON WIRING ASSEMBLIES --- AND A DETAILED PLAN WAS DEVELOPED TO ADDRESS ALL OF THE PROVEN QUALITY DETRACTORS. STATISTICAL TECHNIQUES WERE USED TO DETERMINE THE PRIORITY OF EACH PROBLEM BASED ON ITS EFFECT ON YIELD. IN THE FIRST YEAR, THE NUMBER OF WIRING ASSEMBLIES --- PASSING ALL PROCESS STEPS WITHOUT NEEDING ANY REWORK --- HAS CLIMBED DRAMATICALLY. AND PRODUCTIVITY IS UP MORE THAN 35 PERCENT!

WE'RE ALSO TAKING STEPS TO ENHANCE THE QUALITY OF OUR PEOPLE BY PROVIDING INCREASED TRAINING OPPORTUNITIES. FOR EXAMPLE, WE HAVE INSTITUTED PROGRAMS DESIGNED TO "RE-EDUCATE" OUR VETERAN ENGINEERS --- TO, FOR EXAMPLE, LEARN HOW TO PROGRAM THEIR OWN COMPUTERS.

WE ARE ALSO PROVIDING OUR SENIOR EXECUTIVES --- INCLUDING MYSELF --- WITH AN INTENSIVE, SEVERAL-WEEK "EXECUTIVE REFRESHER COURSE" AT CARNEGIE-MELLON UNIVERSITY. THIS SEMINAR CENTERS AROUND MANAGEMENT ISSUES LEADING THROUGH THE 1990s --- WITH GRADUATE-LEVEL MINI-COURSES IN TECHNOLOGY, ECONOMICS AND PUBLIC POLICY.

WE HAVE INVITED PRE-EMINENT FIGURES IN THE QUALITY PROFESSION TO SPEAK WITH US --- SUCH AS DR. JURAN, DR. DEMING AND DR. ISHIKOWA. THEY HAVE BEEN MOST HELPFUL IN HELPING US TO REORIENT OUR APPROACH TO THE MANAGEMENT OF QUALITY. I'M DELIGHTED THAT I'M ON THE SAME PROGRAM TODAY AS IS DR. JURAN --- AS I ALSO WAS TWO WEEKS AGO IN DETROIT FOR THE ANNUAL CONFERENCE OF THE AMERICAN SOCIETY FOR QUALITY CONTROL.

IMPORTANTLY, WE ARE CONDUCTING EXECUTIVE MANAGEMENT QUALITY SEMINARS --- TO ACQUAINT OUR SENIOR MANAGEMENT WITH WAYS IN WHICH THEY CAN BECOME VISIBLY AND EFFECTIVELY INVOLVED IN QUALITY IMPROVEMENT.

WE EXTENDED THIS CONCEPT RECENTLY BY HOSTING A TWO-DAY QUALITY AND PRODUCTIVITY WORKSHOP, THROUGH THE AUSPICES OF AIA, WITH SENIOR EXECUTIVES FROM 20 AEROSPACE AND DEFENSE COMPANIES IN ATTENDANCE.



I AM INDEED ENCOURAGED BY THE ENTHUSIASM AND EXPERTISE SHOWN BY OUR INDUSTRY PARTNERS --- AND AM HOPEFUL THAT SUCH SEMINARS WILL BECOME ROUTINE THROUGHOUT AMERICAN INDUSTRY. THEY ARE AN EFFECTIVE WAY TO PROMULGATE "LESSONS LEARNED" AND TO HELP ACCELERATE PRODUCTIVITY AND QUALITY IMPROVEMENT IN OUR NATION.

TO GIVE YOU A FEEL FOR THE ATTITUDES OF OUR AEROSPACE AND DEFENSE EXECUTIVES, LET ME READ THREE BRIEF EXCERPTS FROM THE MANY LETTERS THAT I RECEIVED AFTER THE RECENT WORKSHOP . . .

FROM AN EXECUTIVE VICE-PRESIDENT: "THE RECENT MEETING AT PITTSBURGH AND BALTIMORE WAS A MOST VALUABLE EXPERIENCE."

"ALL OF US WHO ATTENDED THE MEETING WERE STIMULATED AND WE ALL FELT DISSATISFIED THAT OUR INDUSTRY, AS WELL AS AMERICAN INDUSTRY GENERALLY, HAS A LONG WAY TO GO IF WE ARE GOING TO MEET THE INTERNATIONAL QUALITY AND PRODUCTIVITY CHALLENGE."

FROM A PRESIDENT AND CEO: "I CAME AWAY FROM THE WORKSHOP MORE THAN EVER CONVINCED OF THE IMPORTANCE OF DEDICATING OUR COMPANY EFFORTS TO IMPROVING QUALITY AND PRODUCTIVITY IN FACE OF THE COMPETITION FROM JAPAN, AND THE NEEDS OF AMERICAN INDUSTRY TO ASSERT ITS LEADERSHIP IN PRODUCTIVITY AND TECHNOLOGY."

AND FROM AIA'S PRESIDENT HERE IN D.C.: "ALL OF US WHO ATTENDED, WHICH OF COURSE INCLUDED MANY OF YOUR INDUSTRIAL COLLEAGUES, FEEL THAT WE OWE YOU AT WESTINGHOUSE A TREMENDOUS DEBT OF GRATITUDE FOR YOUR LEADERSHIP IN THIS VITAL AREA. I CAN ASSURE YOU THE MESSAGE WILL NOT BE FORGOTTEN AND THAT LAST WEEK'S SESSION CONSTITUTED AN IMPORTANT INITIATIVE WITH INDUSTRY-WIDE IMPLICATIONS."

THESE THEN ARE SOME OF THE THINGS WE ARE DOING AT WESTINGHOUSE TO IMPROVE PRODUCTIVITY AND QUALITY.

IN MY VIEW, THIS IS THE MOST CHALLENGING AND PROMISING PROGRAM THAT WE HAVE EVER UNDERTAKEN.

SIMILAR PROGRESS MUST BE MADE THROUGHOUT AEROSPACE AND DEFENSE --- AND ALL OF AMERICAN INDUSTRY TO PROTECT OUR STANDARD OF LIVING AND TO ASSURE OUR NATIONAL SECURITY!

IT IS MY BELIEF THAT AN EFFECTIVE RESPONSE TO OUR ECONOMIC PROBLEMS --- AND PARTICULARLY THE COMPETITIVE JAPANESE INITIATIVES --- IS A UNIFIED APPROACH BY ALL SEGMENTS OF AMERICAN SOCIETY.

ONE KEY REASON FOR JAPAN'S SUCCESS IS THAT THEIR COUNTRY HAS A RELATIVELY FORWARD LOOKING AND COLLABORATIVE RESPONSE TO ALL PROBLEMS. FOR EXAMPLE, THE JAPANESE GOVERNMENT IS SPONSORING AMBITIOUS MANUFACTURING RESEARCH PROGRAMS --- WHICH NO SINGLE COMPANY COULD AFFORD TO UNDERTAKE ALONE. AND JAPAN HAS ESTABLISHED A CLEAR-CUT INDUSTRIAL AGENDA --- IDENTIFYING SPECIFIC EXPORT MARKETS WHICH THEY BELIEVE ARE RIPE FOR EXPLOITATION. AS A RESULT, THEY ARE OVERTAKING US IN STRATEGIC WORLD MARKETS.

THEY HAVE BECOME PREEMINENT IN THE INDUSTRIAL SEGMENTS THAT THEY HAVE TARGETED --- SUCH AS, STEEL-MAKING, SHIPBUILDING, MOTORCYCLES, HOME ELECTRONICS AND AUTOMOBILES. PREEMINENCE HERE REFERS TO HIGHER QUALITY PRODUCTS AT LOWER COSTS.

THEY ARE NOW CHALLENGING US IN HIGHER TECHNOLOGY PRODUCTS --- INCLUDING SEMI-CONDUCTORS, COMPUTERS, COMMUNICATIONS, MACHINE TOOLS, AND ROBOTS.

OUR MOST RECENT STUDIES HAVE CONCLUDED THAT THEY CLEARLY PLAN TO DOMINATE WORLD MARKETS IN THESE FIVE ADDITIONAL PRODUCT AREAS.

FOR INSTANCE, LAST NOVEMBER --- AT AN INTERNATIONAL CONFERENCE ON FIFTH-GENERATION COMPUTER SYSTEMS --- THE JAPANESE UNVEILED A MASTER PLAN FOR THE DEVELOPMENT OF COMPUTERS TO MEET THE NEEDS OF THE 1990'S. HERE IS A MOBILIZATION ON A NATIONAL SCALE THAT IS AIMED AT THE DOMINATION OF THE WORLD COMPUTER MARKET. AND MOST OF THESE ADVANCED COMPUTER CONCEPTS WERE ORIGINALLY DEVELOPED BY THREE AMERICAN UNIVERSITIES.

THEIR INDUSTRIAL ROBOT INDUSTRY IS GROWING AT A FASTER PACE THAN ANYONE HAD PREVIOUSLY ESTIMATED. IT IS NOW ESTIMATED THAT BY 1985, THE JAPANESE WILL BE PRODUCING ABOUT 55,000 ROBOTS PER YEAR --- SEVERAL TIMES MORE THAN THE MOST OPTIMISTIC ESTIMATE FOR THE U.S. THEY CURRENTLY HAVE ABOUT 180 DIFFERENT MANUFACTURERS OF ROBOTS. AS A NATION, THEY ARE LAYING THE GROUNDWORK TO BE THE LOWEST-COST, HIGHEST QUALITY PRODUCER OF INDUSTRIAL ROBOTS IN THE WORLD. AGAIN, THEIR ORIGINAL ROBOT KNOW-HOW CAME FROM A COUPLE OF AMERICAN COMPANIES.

SIMILAR JAPANESE PROGRAMS ARE WELL UNDERWAY --- UNDER THE SPONSORSHIP OF MITI --- IN SEMICONDUCTORS, COMMUNICATIONS AND MACHINE TOOLS. CONSEQUENTLY, MOST OF OUR AMERICAN COMPANIES --- WHO, IN EFFECT, MUST INDIVIDUALLY FACE SUCH NATIONALIZED COMPETITION --- WILL BE IN SEVERE COMPETITIVE DIFFICULTIES SOON.

I HOPE THAT WE'RE NOT COMFORTABLE OVER THE PROSPECTS OF HAVING AMERICAN PRODUCTS MADE BY JAPANESE MACHINE TOOLS AND ROBOTS --- AND AMERICAN SYSTEMS COMPOSED OF JAPANESE SEMICONDUCTORS, COMPUTERS AND/OR COMMUNICATIONS EQUIPMENT. RATHER, I HOPE THAT WE SOON UNDERTAKE A SERIES OF BOLD, COOPERATIVE PROGRAMS. FOR EXAMPLE, VHSIC PROGRAM-LIKE INITIATIVES SHOULD SOON BE UNDERTAKEN IN GALLIUM ARSENIDE DEVICES, IN FIBER OPTICS, AND IN NEXT GENERATION COMPUTERS. AND TECH-MOD PROGRAMS SHOULD SOON COVER FLEXIBLE MANUFACTURING SYSTEMS; NEXT GENERATION ROBOTS; AND "JUST-IN-TIME" PRODUCTION SYSTEMS.

THEN DOD AND THE AEROSPACE AND DEFENSE INDUSTRY WOULD NOT ONLY IMPROVE THE QUALITY AND RELIABILITY --- AND REDUCE THE COST AND PROCUREMENT TIME --- OF WEAPONS SYSTEMS, BUT WE COULD ALSO SERVE TO REVITALIZE MUCH OF THE REST OF AMERICAN INDUSTRY. IN MY JUDGEMENT, THIS IS THE MOST PROMISING PROSPECT TO PRESERVE OUR ECONOMIC, POLITICAL AND MILITARY STRENGTHS.

IN THIS COUNTRY, WE STILL HAVE THE TECHNOLOGY, THE PEOPLE AND OTHER RESOURCES TO MEET THE ECONOMIC CHALLENGE OF JAPAN AND OTHER EMERGING INDUSTRIAL POWERS. WHAT WE LACK IS A NATIONAL COMMITMENT --- AND A WELL SYNCHRONIZED STRATEGY.

THE EFFORT OF EVERY SEGMENT OF OUR SOCIETY IS NEEDED TO STIMULATE OUR NATIONAL PRODUCTIVITY.

FOR EXAMPLE, INDUSTRY AND ACADEME CAN WORK TOGETHER TO IMPROVE THE TRAINING OF EMPLOYEES SO THAT WE HAVE A MORE COMPETITIVE WORK FORCE. IN A TYPICAL LARGE JAPANESE FACTORY, ALL OF THE WORKERS ARE LITERATE, NUMERATE HIGH-SCHOOL GRADUATES. TYPICALLY, THEY RECEIVED SIX TO 12 MONTHS OF COMPANY TRAINING --- WHEN THEY JOINED THEIR COMPANY. AND THEN THEY PARTICIPATE REGULARLY IN A QUALITY CIRCLE. SO, NOT ONLY ARE THEY BETTER TRAINED --- BUT THEY ALSO ARE MUCH MORE INVOLVED-AND-MOTIVATED --- THAN ARE OUR TYPICAL EMPLOYEES.

INDUSTRY AND LABOR MUST JOIN FORCES TO MAKE THE PIE BIGGER --- RATHER THAN FIGHT OVER HOW TO SLICE IT UP. FOR EXAMPLE, OUR EMPLOYEES SHOULD BE DEVELOPED SO THAT THEY CAN, FOR EXAMPLE, NOT ONLY OPERATE SEVERAL DIFFERENT MACHINES --- BUT ALSO PROGRAM AND MAINTAIN THEM. THIS MAKES THEM NOT ONLY MORE VERSATILE-AND-VALUABLE --- BUT ALSO MORE PRODUCTIVE AND SATISFIED. TOWARD THIS END, WE ARE NOW WORKING WITH ONE OF OUR UNIONS TO REDUCE BY TWO-THIRDS THE NUMBER OF FACTORY JOB DESCRIPTIONS IN ONE OF OUR DEFENSE PLANTS --- INDICATIVE OF HOW INDUSTRY AND LABOR CAN-AND-SHOULD COOPERATE FOR EVERYONE'S BENEFIT.

INDUSTRY MUST LEARN THE IMPORTANCE OF MANAGEMENT CHANGE --- AND BE WILLING TO IMPLEMENT BOLD AND INNOVATIVE CHANGES WITHIN THEIR RESPECTIVE ORGANIZATIONS. WE CAN'T HAVE SIGNIFICANT QUALITY AND PRODUCTIVITY IMPROVEMENT UNLESS WE ARE WILLING TO IMPLEMENT SIGNIFICANT CHANGES WITHIN OUR ORGANIZATIONS.



FOR EXAMPLE, TWO OF THE BASIC MANUFACTURING CONCEPTS THAT MANY OF US HAVE USED AS STANDARDS-OF-EXCELLENCE FOR MANY YEARS ARE NOW NOT ONLY NOT EXCELLENT; BUT ALSO NOT COMPETITIVE. THAT IS, OUR "ACCEPTABLE QUALITY LEVELS" ARE NO LONGER ACCEPTABLE --- AND OUR "ECONOMICAL ORDERING QUANTITIES" ARE NO LONGER ECONOMICAL. IN BOTH INSTANCES, THEY HAVE BEEN RENDERED OBSOLETE BY THE JAPANESE.

RELATIVE TO GOVERNMENT, THERE ARE APPARENTLY NO "QUICK FIXES" FOR ACHIEVING PRODUCTIVITY AND QUALITY IMPROVEMENT. SO WE MUST LOOK AT IMPROVING THE FUNDAMENTAL INCENTIVES NEEDED TO INCREASE THE PRODUCTIVITY OF THE INDUSTRIAL BASE --- AND REDUCE OR ELIMINATE THE DETRACTORS.

THE FIRST STEP, IS TO REPLACE THE ADVERSARIAL RELATIONSHIP BETWEEN INDUSTRY AND GOVERNMENT --- WITH A COOPERATIVE, SYNERGISTIC RELATIONSHIP.

WE NEED TO REVISE FEDERAL CONTRACTING PRACTICES TO STIMULATE --- RATHER THAN DISCOURAGE --- PRODUCTIVITY AND QUALITY IMPROVEMENT.

IN DEFENSE CONTRACTING, YEAR-TO-YEAR PROGRAM FUNDING --- AND THE RELATIVELY NEGLIGIBLE PROFIT INCENTIVES FOR PRODUCTIVITY OR QUALITY IMPROVEMENT --- ARE DETERRENTS TO REDUCING THE COST OF DEFENSE SYSTEMS, AND INCREASING THE DEFENSE PRODUCTION BASE SO VITAL TO OUR NATIONAL SECURITY.

TO STIMULATE PRODUCTIVITY IMPROVEMENT, MORE PROFIT SHOULD GO TO THSE CONTRACTORS THAT IMPROVE PRODUCTIVITY AND REDUCE COSTS TO THE GOVERNMENT. THE GREATER THE SHARE OF PRODUCTIVITY IMPROVEMENT SAVINGS THAT INDUSTRY CAN RETAIN, THE GREATER IS THE INCENTIVE TO INVEST IN MORE PRODUCTIVE FACILITIES AND EQUIPMENT --- AND THE GREATER IS THE AVAILABILITY OF CAPITAL TO MAKE THOSE INVESTMENTS.

LET ME CITE AN EXAMPLE FROM WESTINGHOUSE TO ILLUSTRATE THIS POINT.

WE RECEIVED A SEVEN MILLION DOLLAR CONTRACT FROM THE AIR FORCE FOR A TECH-MOD EFFORT WHICH COVERS A RANGE OF ELECTRONICS PROGRAMS. THIS EFFORT STARTED WITH SOME OF THE "SEED MONEY" OF OUR CORPORATE PRODUCTIVITY COMMITTEE --- AND HAS BEEN ACTIVELY ENCOURAGED BY THE AIR FORCE.

THE RESULTING ADVANCED MANUFACTURING CONCEPTS INCLUDE A 3-D ROBOTIC CABLE HARNESS SYSTEM WHERE THE INSTRUCTIONS FOR THE ROBOT ARE GENERATED DIRECTLY BY AN INTERACTIVE GRAPHICS CAD SYSTEM; A ROBOTIZED STORE ROOM WHICH WILL MAKE UP PARTS KITS TOTALLY UNDER COMPUTER CONTROL; AND AN ADVANCED ELECTRONICS ASSEMBLY STATION. BY COMBINING SOPHISTICATED SENSOR, LASER, ROBOTICS AND ARTIFICIAL INTELLIGENCE CAPABILITIES, WE ARE DEVELOPING A SINGLE WORK STATION THAT CAN PRODUCE AN ENTIRE CIRCUIT BOARD --- STARTING WITH A BARE BOARD AND ENDING WITH A FULLY-TESTED AND ASSEMBLED CIRCUIT BOARD.

WE ARE PREDICTING THAT THE BENEFITS OF THE ELECTRONICS ASSEMBLY STATION WILL INCLUDE A SEVERAL-FOLD PRODUCTIVITY INCREASE IN THE ELECTRONIC CIRCUIT BOARD ASSEMBLY PROCESS; A TEN-TO-ONE IMPROVEMENT IN THE MANUFACTURING CYCLE TIME AND WORK-IN-PROGRESS INVENTORY; MORE THAN DOUBLE THE FIRST-TIME PROCESS YIELD; AND A FIVE-TO-ONE REDUCTION IN REQUIRED MANUFACTURING SPACE.

TRULY TREMENDOUS!

HOWEVER, THE EFFORT REQUIRED TO INITIALLY "SEED" SUCH TECHNOLOGY ADVANCES --- AND THEN GET GOVERNMENT ASSISTANCE IN DEVELOPING AND IMPLEMENTING THE MANUFACTURING TECHNOLOGIES --- MAY BE MORE THAN MANY DEFENSE CONTRACTORS WOULD BE WILLING TO UNDERTAKE. WE HAVE JUST RECEIVED TENTATIVE AGREEMENT ON THE BENEFITS SHARING PROVISION OF OUR TECH-MOD AGREEMENT WITH THE AIR FORCE. WHILE THIS IS GOOD NEWS --- IT WAS VERY DIFFICULT GETTING THERE --- AS WE HAVE BEEN NEGOTIATING THIS AGREEMENT SINCE JUNE 1980.

SO MUCH CAN BE DONE TO REDUCE PAPERWORK AND THE REGULATORY BURDEN ON DEFENSE CONTRACTORS WHICH DETRACT FROM PRODUCTIVITY AND QUALITY IMPROVEMENT --- AND TO CHANGE SOME OF THE SPECIFIC CONTRACTING PROCEDURES WHICH HAVE A NEGATIVE IMPACT ON PRODUCTIVITY.

THEREFORE, THE CRITICAL CHALLENGE IS TO STRUCTURE CONTRACTS --- AND PROGRAMS --- SO THAT THEY WILL PROVIDE DOD WITH THE HIGHEST QUALITY WEAPON SYSTEM AT THE LOWEST POSSIBLE COST.

IN CLOSING, LET ME SAY THAT WE HAVE THE ESSENTIAL RESOURCES TO MEET THE ECONOMIC, POLITICAL AND MILITARY CHALLENGES WE ARE FACING. BUT, WE BADLY NEED A STRATEGY AND A COMMITMENT BY BOTH GOVERNMENT AND INDUSTRY; PARTICULARLY BY THE DEPARTMENT OF DEFENSE --- AND BY OUR INDUSTRY --- BOTH SO WELL REPRESENTED IN THIS ROOM. IF WE SUCCESSFULLY TAKE THE LEAD, PERHAPS WE CAN ADD LABOR AND ACADEME TO OUR TEAM --- AND THEN WE'D BE READY TO MEET ANY CHALLENGE!

THANK YOU FOR YOUR KIND ATTENTION.

BOTTOM LINE CONFERENCE

"We are using the systems approach to quality assurance."

VICE ADMIRAL EUGENE A. GRINSTEAD  
DIRECTOR, DEFENSE LOGISTICS AGENCY

Vice Admiral E. A. Grinstead, SC, USN

I. TOP LEVEL CONCERN

A. Industry Participation

- o The Under Secretary of Defense has highlighted the administration's concern for productivity and quality improvements.
- o Quality is now being treated as a major acquisition factor.
- o With your commitment and participation,
  - oo we can meet the challenge of accelerating quality technology.
  - oo We will also contribute to the national challenge of improving American productivity.
- o This will improve the economic condition of all America.

B. Government/Industry Relationship

- o The DoD shall continue to be tough in contract negotiations as part of the buyer-seller relationship. This does not mean that our relationship should be adversarial.
- o We have a shared responsibility to provide our military personnel with effective systems.
- o A spirit of cooperation must be assumed. A healthy, innovative, and competitive defense industry is essential to the reestablishment of our defense posture as second to none.

II. CONTRACT ADMINISTRATION

A. Mission

- o The contract administration mission within DoD is to assure the on time delivery of conforming products and services.
- o This requires effective programs and a dedicated work force to ensure adherence to contractual requirements. We have not always been successful.

B. Approach to Mission

- o Performance of Government quality assurance responsibilities is an extremely complex task. The skills required to perform the job go far beyond those of examining the product.
- o First of all, product quality is your responsibility and secondly, quality cannot be inspected into a product.
- o Our program includes contract review, planning, and procedures evaluation in addition to product inspection and, as you might imagine, corrective action. Our system is an integrated approach designed to assure that contractors control quality.

C. Government Problems

- o There are problems.
  - oo We have accepted material only to have the ultimate user reject it or to create further difficulties for ourselves when defective material is incorporated into weapon systems by other contractors.
  - oo Inadequate and incomplete planning for Government coverage, coupled with a contractor's lack of control, has led to numerous instances of poor contract performance.
  - oo In other cases, we have not effectively assured contractor compliance with requirements for systems or programs along with critical process controls. We have either failed to identify noncompliances or failed to ensure appropriate corrective action in a timely manner.
- o There is also a need to improve specifications and standards that we may include in our contracts.



- oo It does neither the Government nor contractors any good when a specification or standard is so unclear as to mean different things to different people.
- oo Our efforts should not have to weigh upon a forced interpretation of a specification or standard.

- o Last of all and perhaps our biggest problem within DoD with respect to product acceptance, there are still too many instances where our quality managers and in-plant personnel are still trying to inspect quality into products. DoD personnel are responsible for quality assurance whereas contractors are responsible for product quality. There is a vital difference in thrust, although philosophically we point to the same goal.
- o The problems I have mentioned here today have involved a wide range of products including aluminum, integrated circuit devices, transistors, projectiles, armored personnel carriers, overhauled aircraft, uniforms, valves, to name only a few.

D. High Quality Producers

- o In spite of the problems we in the Government and industry face in delivering quality products to the Services, most contractors and Government quality personnel are performing in a commendable manner.
- o Even in the semiconductor field there are high quality manufacturers. For example, Government quality personnel have noted only 2 minor discrepancies out of over 20,000 system and product observations during the past 6 years at a MIL-S-19500 transistor plant. This particular firm is but one example of a quality producer.
- o So are many other defense-oriented contractors. I hope that you are one.

III. DEMAND ON QUALITY RESOURCES WITHIN DoD

- o Government quality assurance policies and procedures must continuously advance to keep pace with technological changes in systems, hardware, software, and product requirements.
  - oo This places an ever-increasing demand on all personnel as more sophisticated products are acquired by the Services in greater numbers.
  - oo We need to assure that Government Source Inspection is applied only in those instances where it meets the intent of the Defense Acquisition Regulation (DAR), and where it is paying real dividends to our customers.
- o This problem is compounded by Government buying activities imposing unnecessary and excessive mandatory inspections by Government quality personnel in the belief that concentration on inspection can improve product quality.
  - oo Excessive product inspection can result in contractors becoming dependent upon the Government for a portion of their quality effort. The end result is taking our quality resources from where they are needed most: early identification and prevention of quality problems.
  - oo We must use our quality resources to establish a system of proactive quality management within DoD.

#### IV. DoD ACTIONS

##### A. Actions to Improve DoD Capability

- o Within the DoD, we are taking action to improve our current and future performance.
  - oo Quality assurance personnel are being provided the contract administration, quality systems, and technical training necessary to discharge their duties and responsibilities in a professional manner. Certification of in-plant personnel and the establishment of quality intern programs are but two examples of our efforts to improve the professionalism of the quality assurance work force. Lifelong education is a fact of life for those in the quality assurance career field.
  - oo We are using the systems approach to quality assurance.
    - ooo The systems approach concentrates our efforts on the evaluation and surveillance of contractor processes and management systems to assure that process control is in fact occurring. This reduces our dependence on more labor-intensive, after-the-fact inspection methods for assuring contractor compliance with quality requirements, which ultimately contributes to increased scrap, rework, and late delivery.
    - ooo This also involves vigorous action on our part to pursue corrective actions in a timely manner when a contractor refuses or is unable to comply with contractual requirements. All of our work is wasted if effective corrective action is not initiated promptly and enforced.

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ooo It has been our experience, all too often, that serious problems with nonconforming material can be traced to failure to initiate and follow up on corrective action.

oo We are now using our special process and product specialists in a more effective manner when initially evaluating contractor controls over complex manufacturing processes and testing techniques.

oo The classification standards for quality assurance personnel are being revised to provide for increased recognition of the complexity of the total quality assurance contract administration function.

ooo This will result in a more equitable assessment and assignment of personnel.

ooo More importantly, it places emphasis on quality assurance rather than on product inspection.

B. Actions to Assist Defense Contractors

- o There is also a need within the DoD to tailor standards and specifications, to stabilize the acquisition process, to establish and maintain realistic delivery dates, and to maintain integrity of the Qualified Products List (QPL).
- o These actions are consistent with our expectation of performance by contractors.
- o Still, it is in the DoD's best interest to provide the best possible environment for doing business on defense contracts.

V. CONTRACTOR RESPONSIBILITY

- o Contractors with DoD contracts are responsible for product quality. Managers in the DoD will insist that you design the required quality and reliability into your products and services.

The demands we place upon you include:

- oo Strict compliance with all technical requirements. Control of material and manufacturing processes is essential for the production of a product meeting contract requirements.
- oo Performance. Contracts will be terminated for cause or progress payments withheld if performance is not obtained. There have been situations where Government in-plant personnel have been pressured to accept certain nonconformances by contractors. Authorized procedures such as waivers or MRB actions where permitted contractually must be used. To preclude future actions of this type we are seeking to restrict waivers and deviations only to those cases where legitimate technical justification exists. We are also insisting that Government contracting officers support in-plant quality personnel in their efforts to obtain proper corrective action.

VI. CLOSING

I wish to express my sincere appreciation to each defense contractor executive and Service representative for your attendance here today. Your commitment to QUALITY is the Bottom Line.

BOTTOM LINE CONFERENCE

"Quality has to start at the beginning of the product development cycle. Moreover, we need to design production processes so that production workers are able to perform all tasks exactly as designed, so that products can be made precisely as designed."

LIEUTENANT GENERAL ROBERT J. LUNN, USA  
DEPUTY COMMANDING GENERAL,  
DEPARTMENT OF THE ARMY MATERIEL DEVELOPMENT  
AND READINESS COMMAND

LIEUTENANT GENERAL ROBERT J. LUNN  
DEPUTY COMMANDING GENERAL FOR RESEARCH, DEVELOPMENT AND ACQUISITION  
U.S. ARMY MATERIEL DEVELOPMENT AND READINESS COMMAND

"BOTTOM LINE" CONFERENCE ON PRODUCT QUALITY  
FORT MCNAIR, WASHINGTON, D.C.  
13 MAY 1982

NOTE:  
SPEECH, AS GIVEN, VARIED  
FROM THIS PREPARED TEXT.

(SLIDE 1 ON - DARCOM SHIELD & CREST)

THANK YOU, , AND GOOD AFTERNOON LADIES AND  
GENTLEMEN. I'M VERY PLEASED TO BE HERE THIS AFTERNOON TO SERVE  
AS A DEPARTMENT OF THE ARMY REPRESENTATIVE FOR THIS CONFERENCE.  
TODAY, VERY BRIEFLY, I'D LIKE TO DISCUSS PRODUCT QUALITY AND  
PRODUCT ASSURANCE AND THEIR IMPORTANCE TO ARMY READINESS.  
ADDITIONALLY, I'LL SAY A FEW WORDS ABOUT SOME ARMY INITIATIVES  
AIMED AT ENHANCING QUALITY THROUGH PRODUCTIVITY IMPROVEMENT.

AS DARCOM DEPUTY COMMANDING GENERAL FOR RESEARCH, DEVELOPMENT AND  
ACQUISITION, MY MAIN CONCERN WITH PRODUCT QUALITY IS ITS ROLE IN  
HELPING THE COMMAND TO ACQUIRE, PRODUCE, OPERATE, AND MAINTAIN  
RELIABLE EQUIPMENT FOR THE ARMY, OUR SISTER SERVICES, AND OUR  
ALLIES.



BEFORE I GET INTO THE MEAT OF MY REMARKS ON QUALITY, LET ME GIVE YOU A BRIEF OVERVIEW OF DARCOM - INCLUDING ITS MISSION, FUNCTIONS, AND ORGANIZATION. I BELIEVE THAT THIS WILL PROVIDE SOME INSIGHT AS TO WHY QUALITY MATERIEL IS OF PARAMOUNT IMPORTANCE TO THE ARMY.

(SLIDE 1 OFF)

(SLIDE 2 ON - COMMAND RELATIONSHIP)

DARCOM IS ONE OF FIFTEEN MAJOR ARMY COMMANDS AND ONE OF FIVE COMMANDED BY A FOUR-STAR GENERAL.

(SLIDE 2 OFF)

(SLIDE 3 ON - MISSION)

OUR MISSION IS SUPPORT -- SUPPORT FOR THE TOTAL ARMY. . . ACTIVE, ARMY NATIONAL GUARD, ARMY RESERVE. WE ALSO SUPPORT OUR SISTER SERVICES AND, THROUGH OUR SECURITY ASSISTANCE PROGRAM, OUR ALLIES.

I WOULD LIKE TO EMPHASIZE THAT WE DO NOT, AND COULD NOT, PERFORM OUR MISSION IN A VACUUM. WE HAVE NO INTERNALLY GENERATED

MISSIONS: OUR WORK IS DONE IN RESPONSE TO ARMY NEEDS.

(SLIDE 3 OFF)

(SLIDE 4 ON - COMMAND STRUCTURE)

FROM OUR HEADQUARTERS IN ALEXANDRIA, VIRGINIA, WE OPERATE THROUGH 11 MAJOR SUBORDINATE COMMANDS (MSC'S) - PLUS THE U.S. ARMY SECURITY ASSISTANCE CENTER, AND U.S. ARMY NATICK RESEARCH & DEVELOPMENT LABORATORIES - FROM WHICH WE DIRECT ARMY DEPOTS, ARSENALS, AMMUNITION PLANTS, MAINTENANCE SHOPS, LABORATORIES, PROJECT OFFICES, TEST RANGES, AND PROCUREMENT OFFICES THROUGHOUT THE CONTINENTAL UNITED STATES (CONUS) AND OVERSEAS. BUT AS THE ARMY'S PRIMARY MATERIEL DEVELOPER, DARCOM IS DEPENDENT UPON AMERICAN INDUSTRY FOR ACCOMPLISHING ITS WORLDWIDE MISSION OF DEVELOPING, PRODUCING, PROCURING, DEPLOYING, MAINTAINING, AND SUPPLYING WEAPON AND MATERIEL SYSTEMS. OUR OPERATIONS ARE UNALTERABLY DEPENDENT UPON THE VITALITY OF THE MANUFACTURING BASE IN THIS COUNTRY. THE STRENGTH OF THE ARMY'S DETERRENT AND FIGHTING CAPABILITY IS, AND WILL ALWAYS BE, REFLECTED IN THE COMMITMENT BY BOTH GOVERNMENT AND INDUSTRY TO CONTINUALLY IMPROVE THE QUALITY AND RELIABILITY OF ALL PRODUCTS -- MILITARY AND CIVILIAN -- THROUGHOUT THEIR LIFE CYCLES.

(SLIDE 4 OFF)

(SLIDE 5 ON - QUALITY KEY TO READINESS)

AS I HOPE YOU KNOW AND BELIEVE QUALITY MUST BE AN INTEGRAL PART OF A COMPANY'S MANAGEMENT AND MANUFACTURING PROCESS. OR BOTH PRODUCTIVITY AND PROFITS WILL SUFFER. SIMILARLY, WHEN A PRODUCT IS RECALLED FOR MANUFACTURING OR DESIGN DEFECTS. THE PROFIT MARGIN DECREASES BECAUSE PERSONNEL AND DOLLARS ARE DIVERTED FROM NEW PRODUCTION TO CORRECTING PRODUCT DEFICIENCIES. FOR THE ARMY AND OUR SISTER SERVICES, THE STAKES ARE HIGHER. OUR READINESS TO DETER OR DEFEAT OUR POWERFUL ADVERSARIES IS REFLECTED IN THE QUALITY OF WEAPONS AND EQUIPMENT THAT WE PROVIDE TO OUR SOLDIERS IN THE FIELD. FOR THE ARMY, UNRELIABLE, UNDEPENDABLE, UNSAFE MATERIEL UNDERMINES OUR SOLDIERS' CONFIDENCE IN THEIR EQUIPMENT, ERODES MORALE, AND ULTIMATELY DEGRADES ARMY READINESS.

AT THIS POINT IT IS ONLY FAIR TO WARN YOU THAT IF I HAD BEEN ON YOUR AGENDA AT AN EARLIER TIME IN THE DAY, I WOULD HAVE PICKED ON YOU MORE. BUT IT IS FAIR TO SAY THAT I FEEL THE ARMY IS JUST AS RESPONSIBLE AS YOU FOR THE POSITION WE FIND OURSELVES IN TODAY.

BECAUSE OF THIS I INTEND TO SHOW YOU A FEW OF OUR PROBLEMS. BUT THEN I WILL SPEND MORE TIME ON WHAT WE ARE TRYING TO DO AND I HOPE YOU WILL ASK QUESTIONS IF I AM NOT CLEAR. PLEASE UNDERSTAND

I BELIEVE WE ARE ALL PART OF THE PROBLEM.

(SLIDE 5 OFF)

THE NEXT 4 VUGRAPHS DEPICT QUALITY PROBLEMS THAT WE'VE ENCOUNTERED RECENTLY.

(SLIDE 6 ON - PROJECTILE, 155MM: HE. M483A1)

THIS PROJECTILE IS USED TO DELIVER 88 DUAL PURPOSE ARMOR-DEFEATING AND ANTIPERSONNEL GRENADES. IT CONTAINS 24 GRENADES FOR DEFEATING LIGHT ARMOR AND 64 GRENADES FOR DEFEATING BOTH ARMOR AND PERSONNEL - A VERY COMPLEX ROUND. THE BASE PLATE, SHOWN IN YELLOW, WAS FOUND BY OUR PRODUCT ASSURANCE INSPECTORS TO BE CRACKED IN SEVERAL THOUSAND ROUNDS, DUE TO IMPROPER HEAT TREATING OPERATIONS DURING MANUFACTURE.

(SLIDE 6 OFF)

(SLIDE 7 ON - FUEL TANK UNLOADING CONNECTOR HOSE)

THIS HOSE WAS FOUND TO HAVE BEEN PAINTED WITHOUT FIRST BEING PRIMED, RESULTING IN SECOND AND THIRD STAGE RUST PRIOR TO THE FUEL TANK BEING ISSUED TO OUR FIELD SOLDIERS. THE ENTIRE SHIPMENT OF TANKS REQUIRED REINSPECTION AND REPLACEMENT OF BAD HOSES.

(SLIDE 7 OFF)

(SLIDE 8 ON - M549 WARHEAD)

IMPROPER FORGING AND HEAT TREATMENT PROCESSES RESULTED IN THE CRACK IN THE ENTIRE CIRCUMFERENCE OF THIS WARHEAD. THE STOCKPILE HAD TO BE SCREENED 100 PERCENT IN ORDER TO IDENTIFY ANY ADDITIONAL CRACKED WARHEADS.

(SLIDE 8 OFF)

(SLIDE 9 ON - INCIDENTS REQUIRING ENGINE REMOVAL)

THIS GRAPH SHOWS THE RATIO OF ENGINE REMOVALS PER VEHICLE DURING A RECENT EIGHT MONTH PERIOD IN ONE OF OUR MAJOR PROGRAMS. THE ENGINES HAD TO BE REMOVED BECAUSE THE VEHICLES COULD NOT MAKE IT THROUGH FINAL INSPECTION, AND YOU CAN SEE THAT IN THE EARLY STAGES AN AVERAGE OF MORE THAN ONE ENGINE REMOVAL PER VEHICLE IN ANY PROGRAM WOULD BE A SIGNIFICANT ADDED COST BECAUSE OF QUALITY SHORTFALL IN PRODUCTION.

(SLIDE 9 OFF)

(SLIDE 10 ON - QUALITY NOW)

THE AUTHORIZED STRENGTH OF THE ARMY HAS BEEN STABILIZED SINCE 1974 AT ABOUT 775,000 TO 780,000 PERSONNEL. BUT DURING THE 1980'S, WE WILL INTRODUCE APPROXIMATELY 500 NEW AND PRODUCT-IMPROVED, TECHNOLOGY-LOADED SYSTEMS INTO OUR INVENTORY -- UNDER THE ARMY'S MASSIVE FORCE MODERNIZATION PROGRAM. AT THE SAME TIME, WE WILL CONTINUE TO OPERATE AND SUPPORT OLDER SYSTEMS STILL IN THE INVENTORY, BECAUSE MOST OF OUR NEW SYSTEMS SUPPLEMENT, RATHER THAN REPLACE OUR CURRENT EQUIPMENT. FOR EXAMPLE, OUR M1 ABRAMS TANK WILL SUPPLEMENT OUR M60A3. OUR ARMY IS BECOMING MORE EQUIPMENT-INTENSIVE, BOTH OPERATIONALLY AND FROM THE STANDPOINT OF MAINTAINABILITY OF INCREASINGLY COMPLEX SYSTEMS.

THE PROLIFERATION OF NEW WEAPON SYSTEMS AND COMPLEX INTEGRATED LOGISTICS SUPPORT REQUIREMENTS HAVE, OF NECESSITY, FOCUSED ATTENTION ON HAVING ONE ITEM PERFORM MANY FUNCTIONS FOR SEVERAL DIFFERENT SYSTEMS. FOR EXAMPLE, AUTOMATIC TEST EQUIPMENT IS BEING DESIGNED TO MEET THE DIAGNOSTIC REQUIREMENTS OF SEVERAL MAJOR SYSTEM COMPONENTS. THIS APPROACH IS USED TO REDUCE TOTAL COSTS, IMPROVE TOTAL EFFECTIVENESS, AND DECREASE THE NUMBER OF PROCUREMENT ACTIONS REQUIRED TO FIELD OUR NEW SYSTEMS.

MOREOVER, OUR MAINTENANCE RESOURCES - PERSONNEL, DOLLARS, AND FACILITIES - ARE LIMITED. CONSEQUENTLY, THE ARMY NEEDS EQUIPMENT

DESIGNED TO REDUCE DOWNTIME, TROUBLESHOOTING TIME, AND MAINTENANCE TIME. WE NEED FEATURES SUCH AS DIAGNOSTIC CAPABILITY AND BUILT-IN TEST EQUIPMENT. SIMPLIFIED MAINTENANCE PROCEDURES, AND COMPLETE MAINTENANCE MANUALS SO THAT WE CAN MAXIMIZE THE PRODUCTIVITY OF OUR MECHANICS AND TECHNICIANS.

DURING THE 1970's, DARCOM'S MATERIEL DEVELOPMENT COMMANDS ESTABLISHED STRONGER RELIABILITY, AVAILABILITY, AND MAINTAINABILITY (RAM) PROGRAMS, AND OUR RECENTLY-FIELDED BLACK HAWK HELICOPTER IS AN EXAMPLE OF A SYSTEM THAT ACHIEVED MOST OF ITS RAM GOALS THROUGH INTENSIFIED PROGRAMS WITHIN OUR AVIATION COMMUNITY. BUT NEITHER DARCOM NOR THE ARMY HAVE ALL OF THE DOLLARS THAT WE NEED FOR RAM AND PRODUCT ASSURANCE. WE MUST RELY ON INDUSTRY TO HELP FILL THE GAPS THROUGH PRIVATE RESEARCH AND DEVELOPMENT PROJECTS AIMED AT INCREASING THE AVAILABILITY OF BOTH OUR OLDER AND OUR NEW SYSTEMS, AND HOPEFULLY REDUCING LIFE CYCLE COSTS. ONE OF THE STRENGTHS OF OUR NATION HAS BEEN THE ABILITY OF AMERICAN INDUSTRY TO SUPPORT OUR MILITARY REQUIREMENTS. I AM CONFIDENT THAT, THROUGH FIRMER BONDS OF PARTNERSHIP WITH THE PRIVATE SECTOR, WE CAN ANTICIPATE ACQUIRING THE QUALITY MATERIEL THAT IS THE HALLMARK OF THE BEST ARMY IN THE WORLD.

(SLIDE 10 OFF)

I WOULD LIKE TO DIRECT THE BALANCE OF MY REMARKS TO INITIATIVES WE'VE TAKEN TO ENHANCE QUALITY AND PRODUCTIVITY, AS WELL AS SOME KEY STEPS WE'RE TAKING TO IMPROVE OUR PRODUCT ASSURANCE PROGRAMS.

(SLIDE 11 ON - MANUFACTURING TECH., PROD. ASSURANCE)

SPECIFICALLY, I WILL DISCUSS OUR PROGRAMS FOR -

- o MANUFACTURING TECHNOLOGY
- o PRODUCT ASSURANCE AND TEST

(SLIDE 11 OFF)

(SLIDE 12 ON - MANUFACTURING TECH.)

THE MANUFACTURING TECHNOLOGY PROGRAM IS A DEPARTMENT OF DEFENSE PROGRAM, AND IS A SIGNIFICANT AND PROVEN APPROACH TO ENCOURAGE ADVANCES IN MANUFACTURING PROCESSES AND ACHIEVE SIGNIFICANT IMPROVEMENTS IN PRODUCTIVITY. SINCE THE INCEPTION OF OUR MANUFACTURING TECHNOLOGY PROGRAM IN 1970, THE ARMY HAS ACHIEVED NUMEROUS SUCCESSES BOTH IN AMMUNITION AND OTHER COMMODITIES SUCH AS TANK-AUTOMOTIVE EQUIPMENT AND AIRCRAFT. THE PROGRAM IS BUDGETED FOR \$106 MILLION IN FY 82, WITH APPROXIMATELY ONE-THIRD BEING SPENT TO IMPROVE AMMUNITION TECHNOLOGY AND PRODUCTIVITY. TOTAL FUNDING FOR FY 83, AS CURRENTLY PROJECTED, IS \$122 MILLION.



OUR OVERALL PROGRAM HAS HAD A 70 PERCENT SUCCESS RATE, WITH A 3-TO-1 SAVINGS-TO-COST RATIO. I HAVE SOME SLIDES DEPICTING SOME SUCCESSFUL RECENT PROJECTS.

(SLIDE 12 OFF)

(SLIDE 13 ON - INSPECTION OF EXPLOSIVE CHARGES)

THIS PROJECT MAKES A SIGNIFICANT CONTRIBUTION IN ELIMINATING A VERY CRITICAL, BUT BORING AND VERY LABOR INTENSIVE JOB. IT ALLOWS US TO INSPECT LOADED ARTILLERY SHELLS ON A CONTINUOUS BASIS - ON LINE - WITH THE USE OF NEUTRON RADIOGRAPHY. IT ALSO ELIMINATES THE USE OF LARGE QUANTITIES OF X-RAY FILM.

(SLIDE 13 OFF)

(SLIDE 14 ON - ROTARY FORGING)

HERE WE HAVE A GOOD EXAMPLE OF THE ADAPTATION OF FOREIGN TECHNOLOGY - AUSTRIAN - AND COMBINING IT WITH A U.S. DEVELOPED AND MANUFACTURED AUTOMATIC COMPUTER OPERATED CONTROL SYSTEM. THIS SYSTEM IS USED IN THE FORGING OF GUN TUBES AND IS INSTALLED IN OUR ARSENAL AT WATERVLIET, NEW YORK.

(SLIDE 14 OFF)

(SLIDE 15 ON - LASER WELDING)

IN THIS PROJECT WE ARE USING A TWO-LASER SYSTEM TO WELD TOGETHER THE PARTS OF THE RECUPERATOR USED ON THE GAS TURBINE ENGINE OF THE ABRAMS (M-1) TANK. IT IS INSTALLED AT OUR PLANT IN STRATFORD, CONNECTICUT.

(SLIDE 15 OFF)

QUALITY MUST BE DESIGNED AND BUILT INTO A PRODUCT - IT CAN'T BE INSPECTED IN. QUALITY HAS TO START AT THE BEGINNING OF THE PRODUCT DEVELOPMENT CYCLE. MOREOVER, WE NEED TO DESIGN PRODUCTION PROCESSES SO THAT PRODUCTION WORKERS ARE ABLE TO PERFORM ALL TASKS EXACTLY AS DESIGNED, SO THAT PRODUCTS CAN BE MADE PRECISELY AS DESIGNED.

(SLIDE 16 ON - PEP)

AT DARCOM, WE'RE TAKING A FRESH LOOK AT THE WAY IN WHICH WE TRANSITION FROM DESIGN INTO PRODUCTION AND WHAT WE SHOULD DO DIFFERENTLY TO MINIMIZE START-UP PROBLEMS AND TO REDUCE PRODUCTION COSTS. IN THE PAST WE HAVE LOOKED UPON PRODUCIBILITY ENGINEERING AND PLANNING (PEP) ONLY IN TERMS OF THE DESIGN OF THE END ITEM. HOWEVER, WE ARE NOW BROADENING OUR HORIZONS AND

INCLUDING IN OUR PRODUCIBILITY EFFORT THE PLANNING OF THE REQUIRED PRODUCTION RESOURCES DURING ENGINEERING DEVELOPMENT. WE REALIZE THE PLANNING EFFORT HAS TO GO FAR BEYOND A "PAPER STUDY." WE MUST SET UP THE HIGH RISK PILOT LINE PORTIONS OF THE PRODUCTION LINE AND ACTUALLY FABRICATE PARTS TO THE ENGINEERING DRAWINGS. THUS, PRIOR TO GOING INTO PRODUCTION, WE WILL BE ABLE TO VERIFY THE DRAWINGS, THE TOOLING, AND OTHER HIGH RISK ELEMENTS OF THE PROPOSED MANUFACTURING OPERATION. WE INTEND TO IDENTIFY AND EXECUTE THE MANUFACTURING TECHNOLOGY EFFORTS PRIOR TO START OF PRODUCTION. IN OTHER WORDS, WE ARE PREPARING TO DO MORE EXTENSIVE PLANNING AND SHOP WORK TO MINIMIZE START-UP PAIN AND PRODUCTION RISK, THUS ASSURING ECONOMIC PRODUCTION.

TO ACCOMPLISH THESE ACTIONS, WE HAVE ELEVATED RESPONSIBILITY FOR THE DARCOM MANUFACTURING TECHNOLOGY PROGRAM TO DIRECTORATE LEVEL. TO IMPROVE THE LEVERAGE OF THE AVAILABLE FUNDS, WE HAVE STARTED A NEW INITIATIVE FOR MORE SYSTEMATICALLY IDENTIFYING MAJOR COST DRIVERS IN THOSE FACTORIES WHICH ARE DEDICATED TO THE PRODUCTION OF MILITARY HARDWARE THROUGH THE CONCEPT OF INDUSTRIAL PRODUCTIVITY IMPROVEMENT. THIS PROGRAM ALLOWS US TO IDENTIFY NEW CAPITAL INVESTMENTS THAT CAN BE MADE TO MODERNIZE OUR FACILITIES AND IMPROVE PRODUCTIVITY. THE WORK GOING ON AT THE STRATFORD ARMY ENGINE PLANT IS AN EXAMPLE OF THIS THRUST. THROUGH IT WE

EXPECT TO ACHIEVE A STEP FUNCTION IMPROVEMENT IN OUTPUT. THERE ARE AT LEAST ANOTHER 20 TO 30 FACILITIES, INDUSTRY AND ARMY-OWNED, WHICH, IF SUBJECTED TO SYSTEMATIC ANALYSIS, WILL CREATE OPPORTUNITIES FOR SUBSTANTIAL IMPROVEMENTS IN PRODUCTIVITY AND PROPORTIONATE REDUCTIONS IN WEAPON COSTS. HOWEVER, AT THE PRESENT TIME, WE ARE TALKING ABOUT LONG-TERM INVESTMENTS FOR WHICH FUNDS ARE CURRENTLY NOT AVAILABLE, BUT FOR WHICH WE HAVE REQUESTED ADDITIONAL DOLLARS IN FY 83 AND THE OUT YEARS.

(SLIDE 16 OFF)

(SLIDE 17 ON - PRODUCT ASSURANCE)

PRODUCT ASSURANCE IS KEY TO QUALITY. AT DARCOM, WE THINK WE HAVE A GOOD PRODUCT ASSURANCE PROGRAM, AND WE ARE ESPECIALLY PROUD OF OUR ABILITY TO DETERMINE CONFORMANCE TO PERFORMANCE REQUIREMENTS. UNDER OUR MATERIEL RELEASE PROGRAM, WE HAVE GOOD CHECKS AND CONTROLS TO ASSURE THAT THE MATERIEL WE PROVIDE OUR TROOPS IS RELIABLE AND SAFE. ADDITIONALLY, WE HAVE RECENTLY LAUNCHED SEVERAL PROGRAMS AIMED AT IMPROVING OUR PRODUCT ASSURANCE AND TEST PROGRAMS. MY ONLY CONCERN IS THAT THIS APPROACH IS ADDED COST - NOT NECESSARY IF CONFORMANCE WAS ACHIEVED.

(SLIDE 17 OFF)

(SLIDE 18 ON - EXEC. MGT. REVIEW)

IN MARCH OF THIS YEAR, WE INITIATED A COMPREHENSIVE EXECUTIVE REVIEW OF OUR TOTAL LIFE CYCLE PRODUCT ASSURANCE AND TEST PROGRAMS, THE FIRST BROAD LOOK AT THESE AREAS IN EIGHT YEARS. TO CONDUCT THE REVIEW, WE HAVE ENLISTED EIGHT PROMINENT BUSINESS LEADERS AND RETIRED ARMY GENERALS TO CONDUCT A NO-HOLDS-BARRED, INDEPENDENT STUDY. THE REVIEW, WHICH IS EXPECTED TO BE COMPLETED IN APPROXIMATELY TWO MONTHS, WILL FOCUS ON BOTH DARCOM AND INDUSTRY QUALITY ASSURANCE PROGRAMS.

(SLIDE 18 OFF)

(SLIDE 19 ON - REVIEW AREAS OF FOCUS)

THE MAIN THRUSTS OF THE REVIEW WILL COVER THESE AREAS.

(SLIDE 19 OFF)

(SLIDE 20 ON - TDP'S)

ONE OF THE PRIMARY AREAS THAT WE'VE ASKED THE REVIEW COMMITTEE TO EXAMINE IS THE ADEQUACY OF THE TECHNICAL DATA PACKAGES (TDP'S) THAT WE PROVIDE TO OUR CONTRACTORS. WE EXPECT THE EXECUTIVE REVIEW TEAM TO DETERMINE IF OUR TDP'S CONTRIBUTE TO PRODUCTION QUALITY PROBLEMS IN ANY WAY. WE ALSO EXPECT TO RECEIVE INPUT ON

THE EFFECTIVENESS OF OUR METHODS FOR VALIDATING OUR TDP'S.

(SLIDE 20 OFF)

(SLIDE 21 ON - MATERIEL TESTING)

DESPITE OUR BEST EFFORTS, WE CAN NEVER FIELD SYSTEMS THAT ARE 100 PERCENT TROUBLE-FREE 100 PERCENT OF THE TIME. WE HAVE NEITHER THE TIME NOR THE MONEY TO DO SO. BUT TESTING IS ONE AREA IN WHICH WE CAN ACHIEVE SUBSTANTIAL PROGRESS IN IMPROVING THE QUALITY AND RELIABILITY OF MATERIEL SYSTEMS. DARCOM ASSIGNS A PRODUCT QUALITY MANAGER TO EACH MAJOR PROGRAM TO PROVIDE CONTINUOUS REVIEW OF ALL PRODUCT ASSURANCE ACTIVITIES, INCLUDING PRODUCTION. UNDER CURRENT POLICY, FIRST ARTICLE TESTING VERIFIES CONFORMANCE OF MATERIEL TO TECHNICAL REQUIREMENTS AND PROVIDES AN EVALUATION OF THE CONTRACTOR'S MANUFACTURING PROCESSES. OUR PRODUCT QUALITY MANAGER, ALONG WITH THE CONTRACTOR AND THE IN-PLANT GOVERNMENT REPRESENTATIVE DETERMINE OVERALL COMPLIANCE WITH CONTRACT REQUIREMENTS AND THE ABILITY OF THE CONTRACTOR TO CONTINUE PRODUCTION OF UNIFORM QUALITY. WE BELIEVE THAT WE HAVE A GOOD SYSTEM TO ACCOMPLISH THESE QUALITY ASSURANCE SURVEYS. BUT, WE'VE ALSO ASKED THE REVIEW TEAM TO LOOK AT THIS PROGRAM TO DETERMINE ITS EFFECTIVENESS.

(SLIDE 21 OFF)

(SLIDE 22 ON - DLA - DARCOM)

LAST YEAR, THE DEFENSE LOGISTICS AGENCY AND DARCOM AGREED TO CONDUCT SELECTED PROGRAM REVIEWS OF MAJOR WEAPON SYSTEM PROCUREMENTS. THE PURPOSE OF THE REVIEWS IS TO MEASURE THE EFFECTIVENESS OF OUR COMBINED PROCUREMENT QUALITY ASSURANCE OPERATIONS IN ORDER TO PRECLUDE ACCEPTANCE OF MATERIEL THAT FAILS TO MEET CONTRACTUAL REQUIREMENTS.

(SLIDE 22 OFF)

(SLIDE 23 ON - REVIEW INITIATIVES)

THE FIRST JOINT PROGRAM REVIEW WAS CONDUCTED FEBRUARY THROUGH MAY 1981 AND FOCUSED ON MUNITIONS METAL PARTS. ONE-HUNDRED-TWENTY-SIX RECOMMENDED ACTIONS RESULTED FROM THE REVIEW, COVERING AREAS SUCH AS PERSONNEL, TRAINING, PRODUCT ASSURANCE FUNDING, IN-PLANT GOVERNMENT CAPABILITIES, AND PROBLEMS IN TRANSITIONING FROM DEVELOPMENT TO PRODUCTION. ALL RECOMMENDATIONS HAVE BEEN OR ARE BEING IMPLEMENTED. SHOWN HERE ARE SOME INITIATIVES THAT HAVE BEEN IMPLEMENTED BY DARCOM.

(SLIDE 23 OFF)

(SLIDE 24 ON - IN-PLANT QA)

A DARCOM POLICY IS BEING DEVELOPED UNDER WHICH EACH OF OUR MAJOR SUBORDINATE COMMANDS WILL OFFER HANDS-ON FAMILIARIZATION AND ORIENTATION TO DEFENSE CONTRACT ADMINISTRATION SERVICES (DCAS) REGIONAL PERSONNEL ON ARMY ITEMS FOR WHICH THEY HAVE CONFORMANCE VERIFICATION AND ACCEPTANCE RESPONSIBILITY. THE INTENT IS TO MAKE IN-PLANT QUALITY ASSURANCE REPRESENTATIVES AWARE OF HARDWARE PECULIARITIES, AND TO GIVE THEM A BETTER UNDERSTANDING OF THEIR ROLES IN THE PRODUCT LIFE CYCLE. TWO OF OUR COMMANDS (ARRCOM & ARRADCOM) HAVE INITIATED THIS POLICY WITH VERY SATISFACTORY RESULTS.

(SLIDE 24 OFF)

(SLIDE 25 ON - CARLUCCI INITIATIVES)

IN ADDITION TO OUR MANUFACTURING TECHNOLOGY AND INDUSTRIAL PRODUCTIVITY IMPROVEMENT PROGRAMS. WE'RE PLAYING AN ACTIVE ROLE IN IMPLEMENTING OTHER INITIATIVES BY DEPUTY SECRETARY OF DEFENSE CARLUCCI FOR IMPROVING THE ACQUISITION PROCESS, WITH SPECIAL ATTENTION TO QUALITY AND RAM MANAGEMENT PRINCIPLES. OUR PRODUCT ASSURANCE AND TEST DIRECTORATE'S QUALITY ENGINEERING DIVISION HAS THE LEAD ROLE IN THESE AREAS. OUR THRUST IS TO ASSURE MAXIMUM QUALITY ASSURANCE INVOLVEMENT AND PARTICIPATION DURING SYSTEM DESIGN AND DEVELOPMENT STAGES, AND TO FULLY TEST AND VALIDATE



DESIGN PARAMETERS PRIOR TO TRANSITIONING TO THE PRODUCT  
MANUFACTURING ENVIRONMENT.

(SLIDE 25 OFF)

(SLIDE 26 ON - PROD. QUALITY - NAT'L GOAL)

THESE, THEN, ARE THE KEY AREAS OF CONCERN THAT WE IN DARCOM SHARE WITH OUR PARTNERS IN GOVERNMENT AND INDUSTRY CONCERNING QUALITY IN OUR MATERIEL PROGRAMS. READINESS OF MATERIEL IN THE HANDS OF OUR TROOPS IS DARCOM'S MAIN MISSION. WITHOUT EQUIPMENT THAT MEETS RAM AND AFFORDABILITY GOALS, WE CAN ACHIEVE NEITHER THE QUANTITY NOR THE QUALITY IN MATERIEL THAT WE NEED TO MAINTAIN THE STRONG DETERRENT AND COMBAT-CAPABLE FORCE THAT WE KNOW WE MUST HAVE. BUT PRODUCING AND PROVIDING QUALITY PRODUCTS IS NOT A MATTER OF LUCK. AS PARTNERS, GOVERNMENT AND INDUSTRY MUST COLLECTIVELY ATTACK RAM, QUALITY, PRODUCTIVITY PROBLEMS FROM THE STANDPOINT OF BETTER LEADERSHIP AND BETTER MANAGEMENT OF PEOPLE, DOLLAR, AND MATERIEL RESOURCES ... AND THESE ARE NOT MERELY ARMY AND DEPARTMENT OF DEFENSE GOALS ... THEY ARE NATIONAL GOALS, AND THEY PRESENT NATIONAL CHALLENGES THAT REQUIRE A NATIONAL RESPONSE.

(SLIDE 26 OFF)

(SLIDE 27 ON - DARCOM - READY & WILLING)

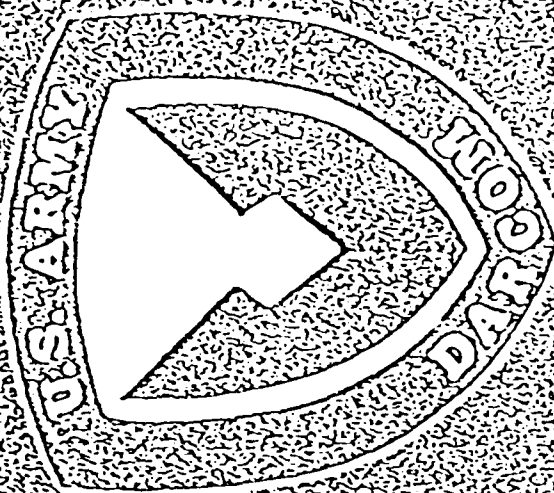
DARCOM AND THE ARMY HAVE MOBILIZED TO MARCH IN PURSUIT OF  
IMPROVED READINESS THROUGH AGGRESSIVE PRODUCTIVITY AND QUALITY  
ENHANCEMENT PROGRAMS. CERTAINLY OUR SOLDIERS DESERVE OUR TOTAL  
COMMITMENT ... WE OWE THEM NOTHING LESS THAN THE VERY BEST.

THANK YOU VERY MUCH.

(SLIDE 27 OFF)

.....

# US ARMY MATERIEL DEVELOPMENT AND READINESS COMMAND

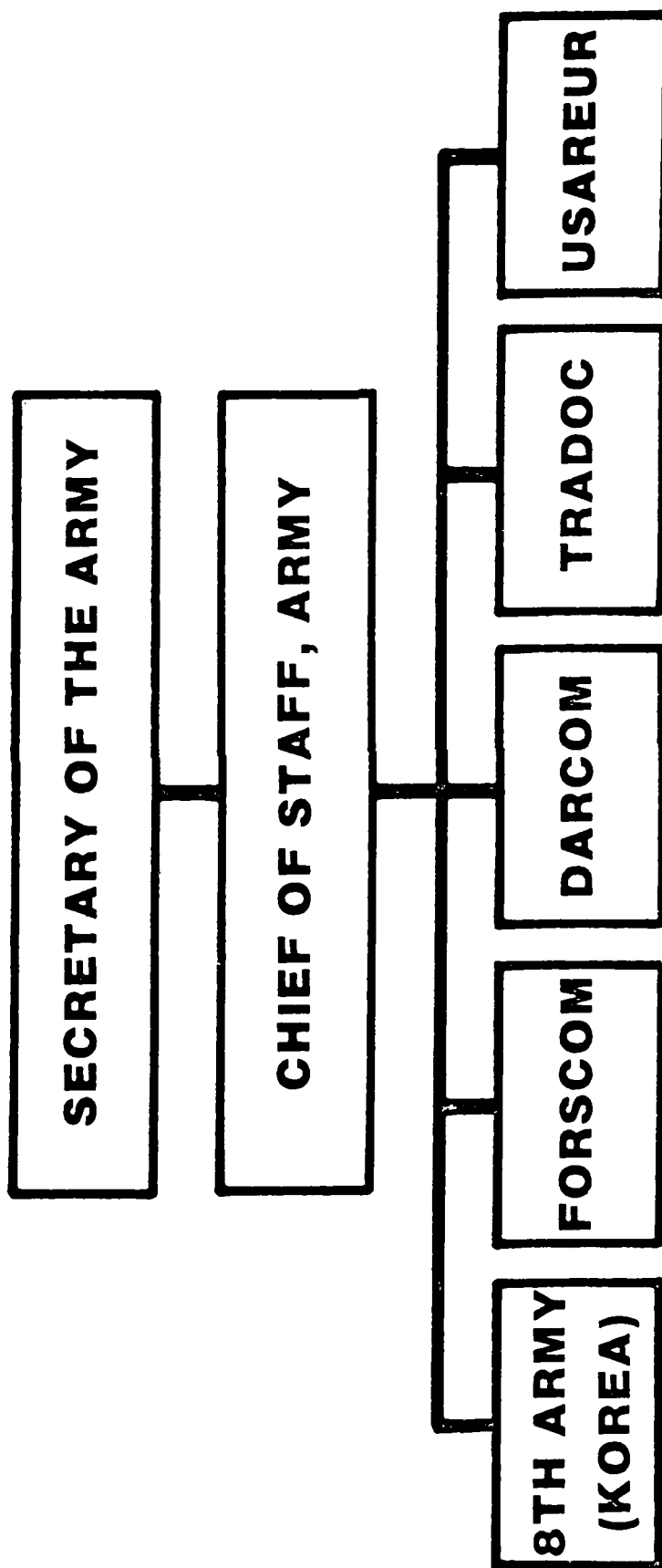


## READY AND WILLING TO HELP ANYWHERE - ANYTIME

DARCOM

Copy Available to DTC Users Only  
No Other Public Release or Production

# COMMAND RELATIONSHIP



DARCOM'S  
MISSION IS...

SUPPORT

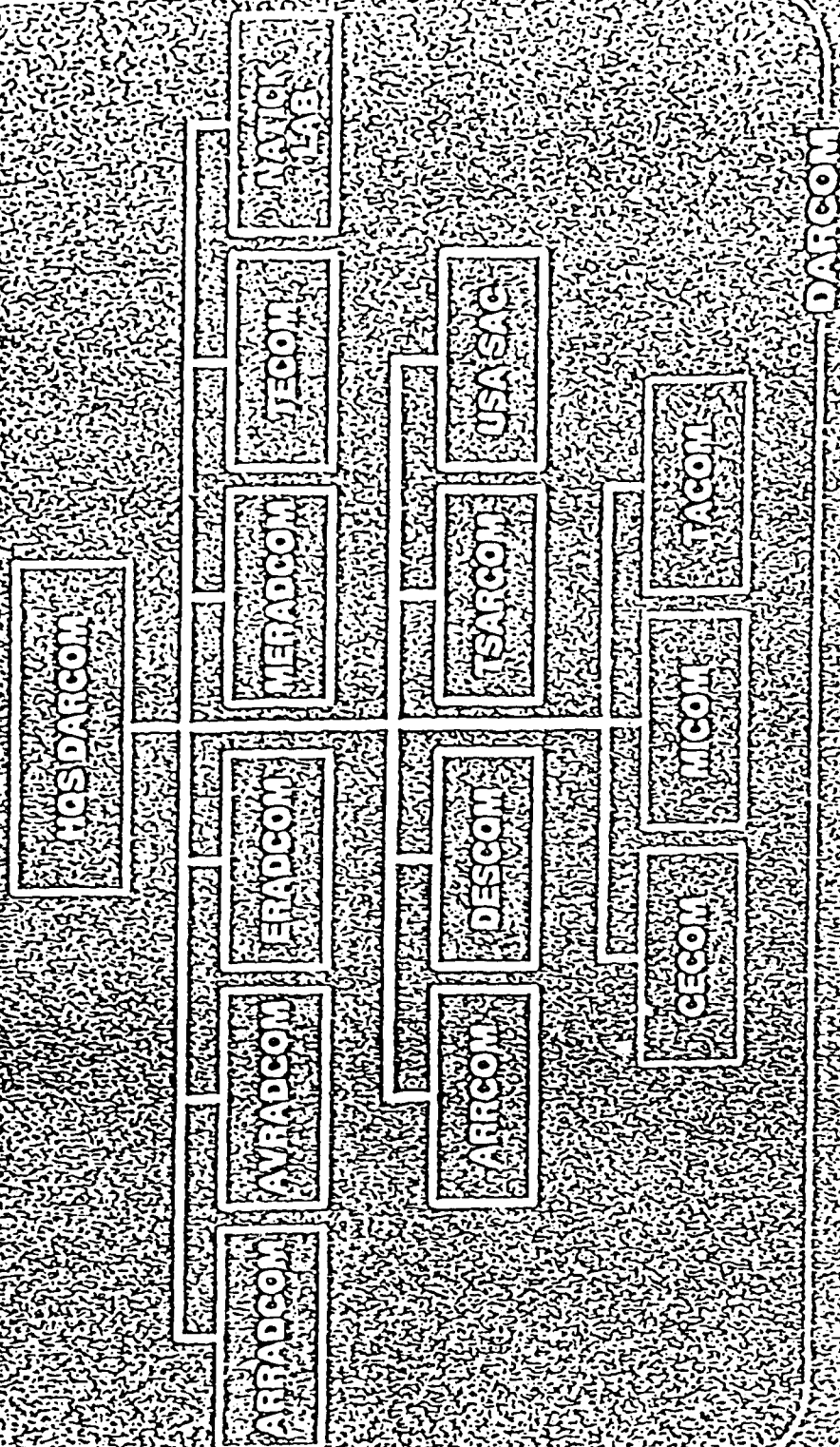
SUPPORT TO THE ARMY'S TOTAL FORCE

• ACTIVE ARMY  
• ARMY NATIONAL GUARD  
• ARMY RESERVE

...AND OUR SISTER SERVICES PLUS -  
OUR ALLIES

DARCOM

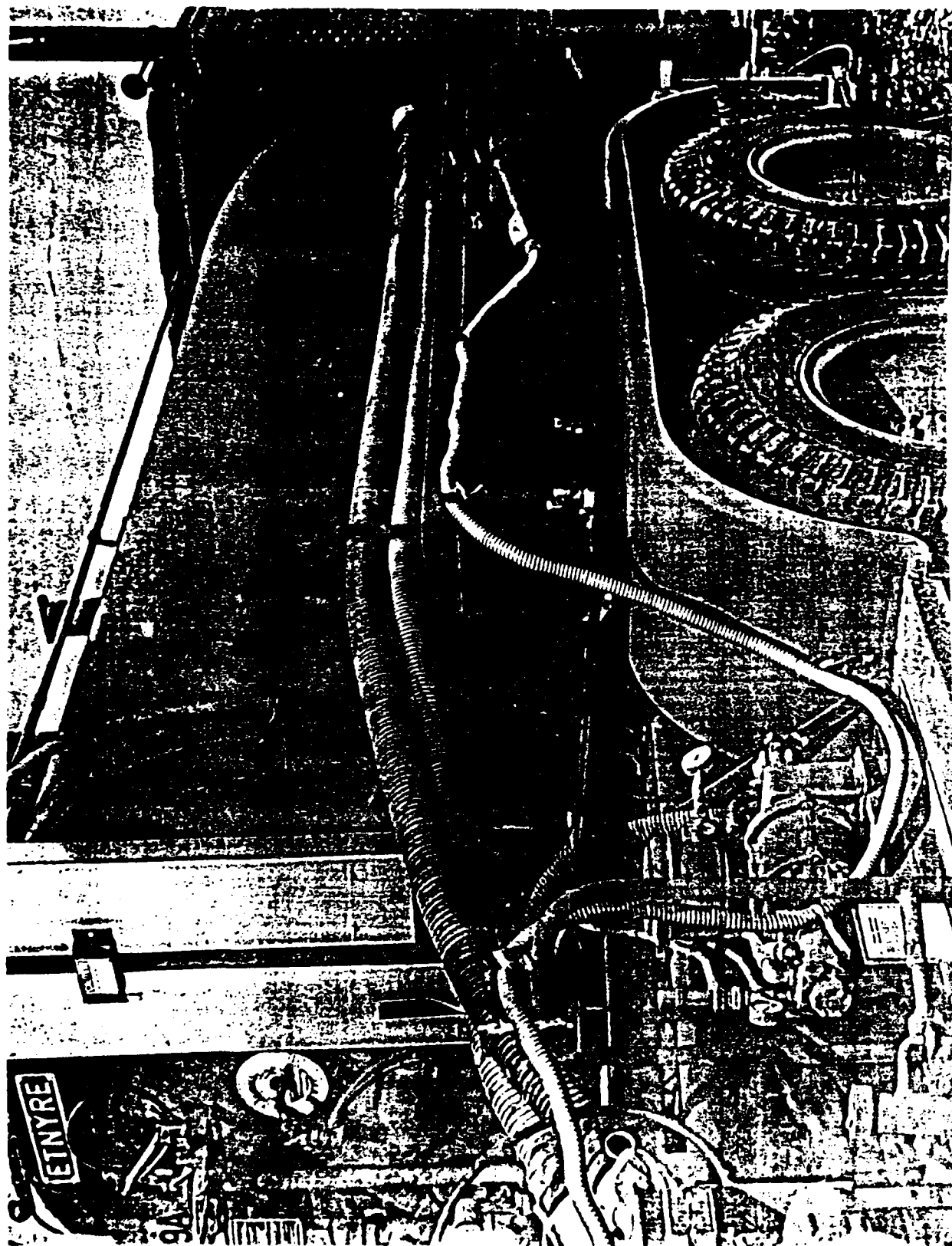
# COMMAND STRUCTURE



# QUALITY KEY TO ARMY READINESS

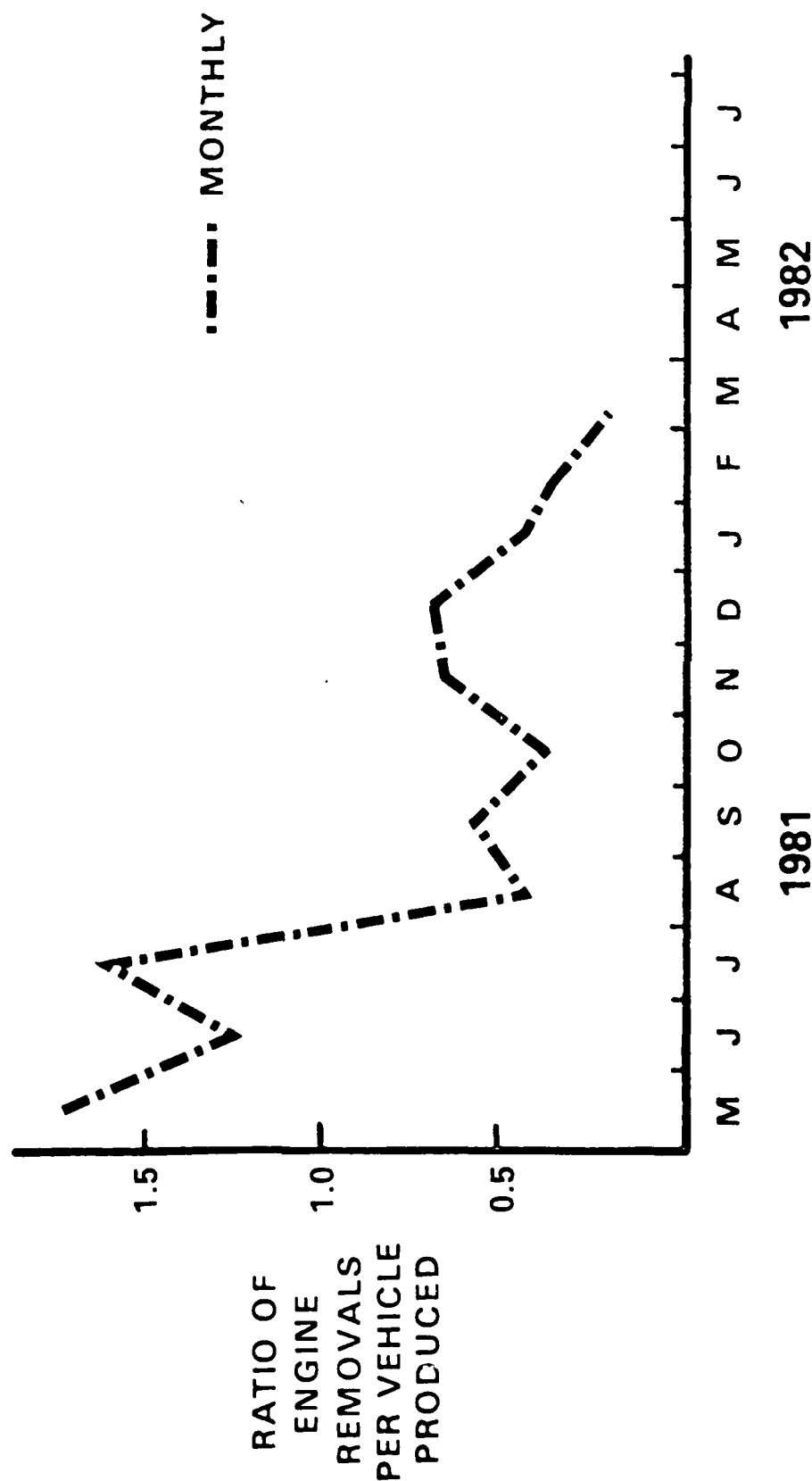
THE COPY OF SLIDE 6 "PROJECTILE, 155MM: HE. M483A1"  
WAS NOT REPRODUCIBLE. HOWEVER, THE SPEECH TEXT  
ADEQUATELY DESCRIBES THE NATURE OF THE SLIDE.





THE COPY OF SLIDE 8 "M549 WARHEAD" WAS NOT REPRODUCIBLE.  
HOWEVER, THE SPEECH TEXT ADEQUATELY DESCRIBES THE NATURE  
OF THE SLIDE.

# INCIDENTS REQUIRING ENGINE REMOVALS PER VEHICLE



# **QUALITY IN ARMY MATERIEL**

**- NOW, AS NEVER BEFORE**

- **FORCE MODERNIZATION -**

- 500 NEW SYSTEMS
- INCREASED COMPLEXITY

- **SCARCE RESOURCES FOR -**

- MAINTENANCE
- PRODUCT ASSURANCE

- **REQUIRES STRONG PARTNERSHIP  
WITH INDUSTRY**

# **MANUFACTURING TECHNOLOGY**

## **PRODUCT ASSURANCE & TEST**

# **MT PROGRAM GOALS**

**DEVELOP OR IMPROVE PRODUCTION  
PROCESSES**

**PRODUCE RELIABLE MATERIEL  
IN AN ECONOMICAL AND  
TIMELY MANNER**

**IMPROVE READINESS**



# MT ACCOMPLISHMENT

## TESTING

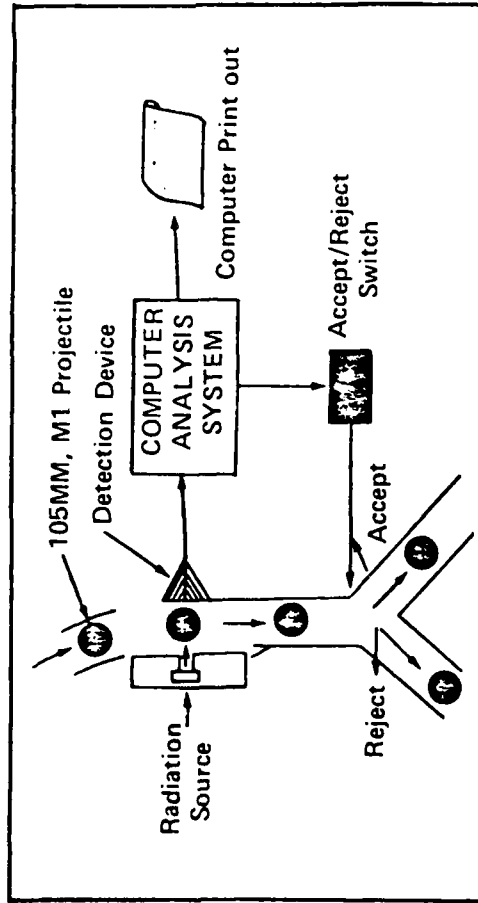
TITLE: MTT - AUTOMATIC INSPECTION DEVICE  
FOR EXPLOSIVE CHARGE IN SHELL

COST \$1.26 Million

## BENEFITS

Automatic on-line inspection of projectiles for hazardous cavities in the explosive will improve safety, cut cost, and enhance Shell reliability.

The filmless method saves manpower and x-ray developing and interpreting cost. Could result in \$3.25 million per plant per year

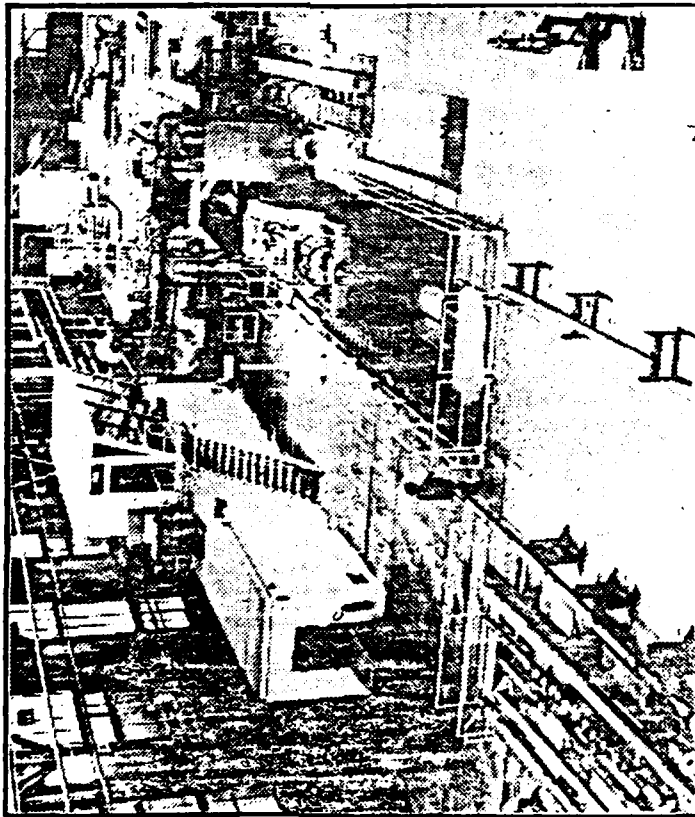


FLOW DIAGRAM OF  
AUTOMATIC INSPECTION SYSTEM

Will permit 100% inspection of 44 rounds per minute.  
of 105MM ammunition.

# MT ACCOMPLISHMENT

## ROTARY FORGING



ROTARY FORGE

TITLE: ROTARY FORGE INTEGRATED  
PRODUCTION TECHNOLOGY

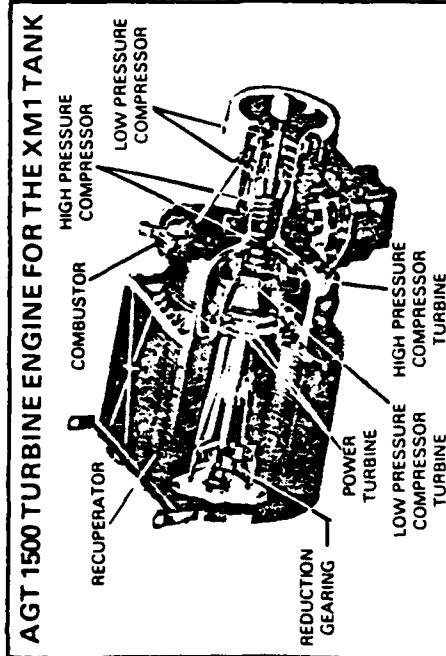
COST: \$260,000

### RESULTS

- AS RESULT OF THIS PROJECT THE EXPECTED SAVINGS OF \$600 PER M68 TUBE CAN BE ACHIEVED



# MT ACCOMPLISHMENT



TITLE: PRODUCTION TECHNIQUES FOR FABRICATION  
OF TURBINE ENGINE RECUPERATOR

COST: \$1,817,000

## RESULTS

LASER WELDING AT 250 IPM PRODUCES A SUPERIOR  
RECUPERATOR AT LOWER COST THAN PRESENT RESISTANCE  
SEAM WELDING AT 50 IPM.

COHERENT EVERLASE 525-1 TWO-LASER WELD SYSTEM  
UTILIZING FIVE-STATION ROTARY FIXTURE WITH LOAD/  
UNLOAD ROBOT TO BE INTEGRATED INTO AUTOMATED  
RECUPERATOR CORE ASSEMBLY LINE AT AVCO-STRATFORD  
PLANT IN MID-1982.

ESTIMATED COST SAVINGS OVER A 7000 ENGINE BUY:

REDUCTION IN WELDING COSTS (@ \$500 PER ENGINE)	\$3,500,000
REDUCTION IN CAPITAL EQUIPMENT COSTS	1,800,000
<b>EST. TOTAL SAVINGS</b>	<b>\$5,300,000</b>

**PEP**

**PRODUCIBILITY ENGINEERING  
& PLANNING**

# PRODUCT ASSURANCE

# **EXECUTIVE MANAGEMENT REVIEW DARCOM PRODUCT ASSURANCE AND TEST PROGRAMS**

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## REVIEW AREAS OF FOCUS

- DETERMINE ADEQUACY OF DARCOM PRODUCT ASSURANCE, WITH EMPHASIS ON HOW EFFECTIVELY THE COMMAND DESIGNS RAM FEATURES EARLY IN SYSTEM DEVELOPMENT
- ASSESS INDUSTRY'S EFFORTS TO IMPROVE QUALITY
- EVALUATE IN-PLANT GOVERNMENT QUALITY ASSURANCE
- REVIEW DARCOM PRODUCT ASSURANCE ORGANIZATION, INCLUDING EXAMINATION OF CAPABILITY AND ADEQUACY OF RESOURCES AVAILABLE TO DO THE JOB

# TECHNICAL DATA PACKAGES

170

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# MATERIAL TESTING

# DLA - DARCOM

## JOINT SELECTED PROGRAM REVIEW



# JOINT SELECTED PROGRAM REVIEW DARCOM INITIATIVES

- REVISE DEFENSE ACQUISITION REGULATION (DAR) TO ENSURE THAT CONTRACT "FIRST ARTICLE" CLAUSES REQUIRE THAT THE FIRST ARTICLE BE MANUFACTURED USING THE SAME PROCESS AND EQUIPMENT TO BE USED FOR QUANTITY PRODUCTION.
- SUPPORT, THROUGH ADDITIONAL MANTECH FUNDING, IMPROVED CONTRACTOR INSPECTION TECHNIQUES TO IDENTIFY, DURING DEVELOPMENT, THOSE MANUFACTURING PROCESSES THAT ARE CRITICAL TO ITEM PERFORMANCE
- RESTRUCTURE TRAINING PROGRAM FOR DARCOM PRODUCT QUALITY MANAGERS (PQM'S)
- INCREASE QUALITY ASSURANCE INTERN TRAINEE AUTHORIZATIONS AND UPGRADE TRAINING PROGRAM

# IN-PLANT QUALITY ASSURANCE

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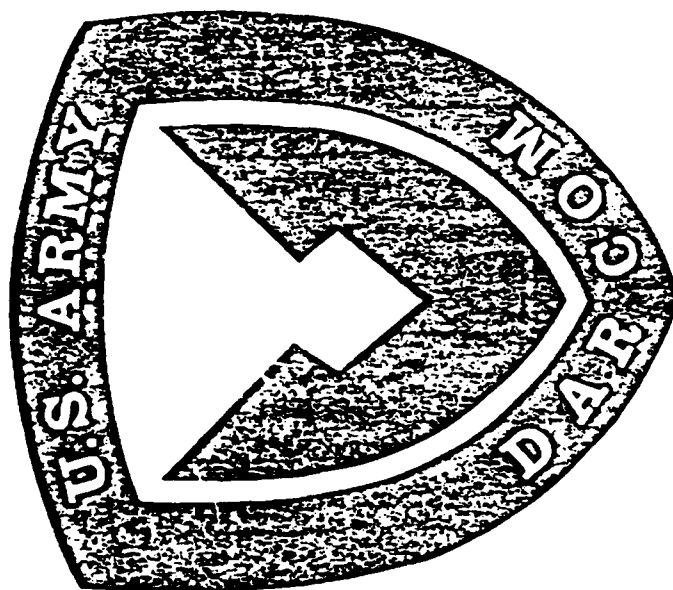
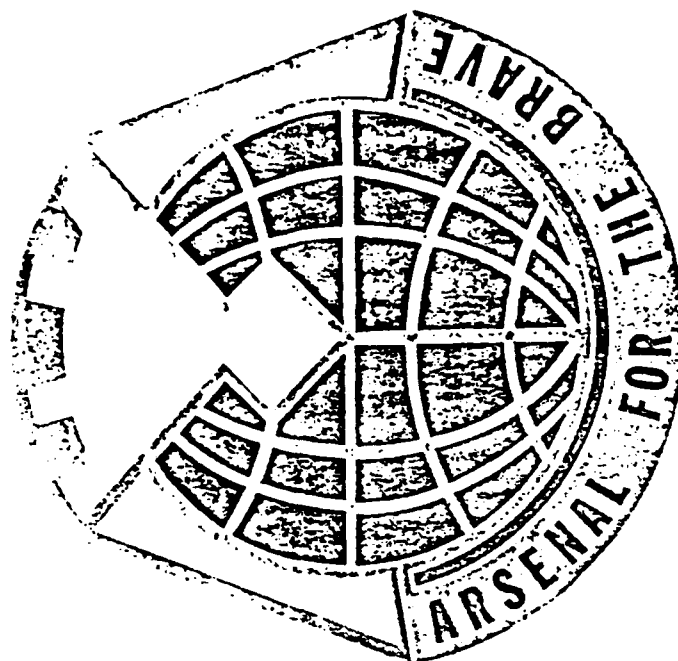
24

# CARLUCCI INITIATIVES

# **PRODUCT QUALITY A NATIONAL GOAL**

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26



BOTTOM LINE CONFERENCE

"I merely ask that you go back and take a close look at the quality of your product --- and then recognize that its success or failure could well mean life or death on the battlefield."

GENERAL PAUL X. KELLEY, USMC  
DEPUTY COMMANDANT,  
UNITED STATES MARINE CORPS

EDITED REMARKS BY GENERAL P. X. KELLEY, USMC

Quality --- that's the theme of the day and that's the bottom line --- Quality. I, too, want to discuss quality, but I'd like to approach it from a different perspective. I am an equipment user, not an equipment developer. In other words, most of my 32 years of military life has been on the operational side, so I'm not too familiar with all of the technical jargon I've heard here today. But, as an infantryman, I do know that quality results from motivation --- motivation results from leadership --- and leadership comes from people who know and understand human values. And that's what I'd like to talk about --- people and values. If there is any one thing I could pluck out of the air and say that this, more than anything else, provides quality --- it's people.

I regret that I was unable to be with you for lunch today, for I had another even more important engagement. My lunch was with nine very special Marines who have much in common. These Marines, eight Sergeants and one Corporal, are the premier rifle squad leaders in our Marine Corps, and I suggest, therefore, that there can be no finer rifle squad leaders in the world. Every year, each of our nine regiments sends its best rifle squad for two weeks of competition on our base at Quantico. And tomorrow night at a magnificent parade here in Washington, we will honor all of these squads and announce the name of the best squad in the entire Corps.

Why do I talk about squads? I do so because on the battlefield that's where it all comes together. The squad, if you think about it, does three basic things --- it moves --- it shoots --- and it communicates. The squad moves on its feet, it moves in a truck, it moves in a LVT, it moves in an LAV, it moves by strategic airlift --- and it is the unit that's going to be in physical contact with the enemy at the forward edge of the battlefield. The squad shoots with the M-16 rifle, or it is supported by TOW's, Dragons, artillery, aircraft, or any other fire support means. The squad communicates by radio, by telephone, by hand and arm signals, and by voice. The point to be made is that one way or another almost every combat function is designed to support the squad. And, lest I forget, this squad normally goes to war aboard a Navy ship, a special ship which is configured for amphibious warfare --- a ship which gets it to an objective area, provides the means to get it ashore in a very systematic way, and provides the support required for sustained combat. In the conduct of the amphibious landing, this squad is supported by aircraft from our carrier decks and naval gunfire from our surface ships. The bottom line is that almost everything you produce supports this squad in its zone of action.

Quality --- I know that Libby Dole mentioned this morning about how well the all-volunteer force is working, and I also know that there are some who are still skeptics. Let me tell you, however, and I hope that I speak for all the Services, that the Quality of the young recruit coming into the Marine Corps today is the finest we have experienced in our 206 year history.



We all have our own statistics, and while I don't particularly like a lot of meaningless statistics, in this case they support what I have just said. But one way to truly measure Quality is, in my opinion, to do what I did last month --- spend two and one half weeks with the operating forces --- with the troops. I guess I probably shook several thousand hands. After being a Marine for 32 years, I know that when you shake a Marine's hand and ask him, "How's it going?" and he looks you right in the eye and says with a firm handshake --- "Great, General" --- and you say --- "Do you really mean that?" --- and he says --- "Yes sir" --- you know he's sincere.

Eighty-one percent of our Marines last year were high school graduates, in contrast to 55 percent in 1975 --- and that's an important point to remember. Our young Marines are patriotic, inquisitive, and talented. Pride, knowledge, and professionalism are their hallmarks.

I hear a lot of criticism about our military capabilities these days from civilians, from our own people in uniform, from academics, from the press, and from the analysts. They wring their hands in desperation --- the force asymmetries make our military posture hopeless. Thank God they weren't around during World War II --- we would have never landed at Iwo Jima because of the casualties on the first day --- The computer model would have never calculated that Von Salmuth's army would have remained in Calais because of a massive allied deception plan; and, if it had not, the force balance would have been such that we might not have succeeded at Normandy. How would you analyze Tinian with a

computer model? The Marines and Army suffered 328 dead as opposed to 5,000 Japanese killed on Tinian. We did it with deception, surprise, and boldness, but the model has no room for these. To those who wring their hands in desperation I'd like to make a single point --- in the final analysis it is people who wins wars --- and we have never lost a war yet!

This country of ours is a great country and there are great people out there who are daily working our problem, but as often as not they need a cause --- They need to be motivated. Recently, I had a great thrill as the principal speaker when we "rolled-out" the first full scale development model of the AV-8B at the plant. In addressing the many people involved in its production, I felt that they were thirsty for knowledge and recognition. They wanted to know how this particular aircraft fit into the Marine Corps --- why it is important to us. We need to tell those people, many of whom work on tedious production lines, why they are important. All too often we get wrapped-up in some computer room, when in reality we should be out seeing what's going on --- talking to people!

You have heard alot of criticism today, but I must tell you that in many ways we in the services are at fault --- we often do you a disservice. We have become an insidious breed of technocrats, not often knowing what we really want or, of more importance, what the fighters really need. Often times when we develop a specific operational requirement --- rather than going to the operator and saying --- "What do you need?" --- We let the technocrat drive the requirement be telling the operator what

high technology can do, and then make that our requirement --- and the poor fighter doesn't have the courage to challenge the system because some highly sophisticated engineer with a computer has put it all together for him. To make my point, we are developing a new weapons system --- with a gun having a velocity of over a mile per second, and most anticipated targets will be within a mile, --- The technocrats want to put a highly complex, sophisticated, computerized sight system on this gun for roughly \$500,000. In my opinion, this gun needs a simple ring sight --- not a lot of pinball lights that flash different colors. But what happens? We will probably go out to industry and set forth a highly complicated and sophisticated menu of requirements --- and complain because the unit cost is so high.

What you and I have to do is get with the operator --- the fighter --- and examine each function of a system to evaluate its essentiality. Each function should be subjected to the most stringent cost/benefit analysis to determine if the fighter needs it --- how much of an improvement is there over current capability --- and is it affordable.

I apologize today for not providing a lot of statistics --- a lot of numbers --- but I did want to share my views on the importance of people. In reality, I am pleading with you to insure quality in any product you provide to our military. Those are some mighty fine young people out there wearing the uniform, and they perform well under some pretty severe hardships. They do it for a lot of reasons, but basically I think it's pride --- pride in themselves, pride in their organization, and pride in

the belief that they are doing the right thing. They are out there, and they don't ask for much in return. You and I have a responsibility, however, to give them the best leadership, housing, medical care, pay, and, above all else, equipment that helps them to kill and to live --- because that's their business.

Unfortunately, some people don't like to hear that. Our business, my job, is to kill --- to think of new and clever ways to kill people --- and not be killed ourselves. You must never forget this! The failure of a system weapons in combat doesn't merely mean that you return it to the factory for repair --- it normally means that someone will be killed.

I hope that you will put my remarks in a positive frame of reference, for they have been intended as such. I merely ask that you go back and take a close look at the quality of your product --- and then recognize that its success or failure could well mean life or death on the battlefield. The ball is in your court. Thank you!

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BOTTOM LINE CONFERENCE HELD ON MAY 13 1982 AT FORT  
LESLEY J MCNAIR WASHINGTON DC(U) OFFICE OF THE  
SECRETARY OF DEFENSE WASHINGTON DC 1982

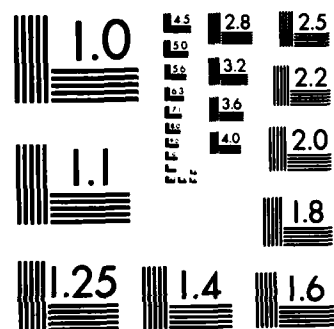
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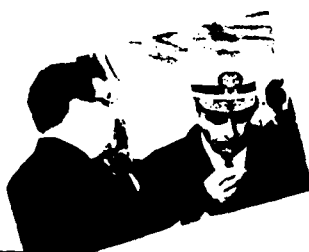
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